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NEW YORK STATE SUPERFUND CONTRACT

New Cassel Industrial Area
Offsite Groundwater
Town of North Hempstead, Nassau County

Remedial Investigation/ Feasibility Study (RI/FS) Report

Volume I • Remedial Investigation Report

Work Assignment No. D002676-42.1

September 2000

Prepared for:

New York State Department of Environmental Conservation

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ENGINEERING AND OPERATIONS SERVICES
NEW YORK STATE SUPERFUND STANDBY CONTRACT

NEW CASSEL INDUSTRIAL AREA
OFF-SITE GROUNDWATER
TOWN OF NORTH HEMPSTEAD, NASSAU COUNTY

Work Assignment No. D002676-42.1

REMEDIAL INVESTIGATION REPORT

Prepared for:

New York State Department of Environmental Conservation
Division of Environmental Remediation

September 2000

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Project No. 650-428

NCIA OFF-SITE GROUNDWATER
REMEDIAL INVESTIGATION/FEASIBILITY STUDY REPORT

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CHAPTER 1

EXECUTIVE SUMMARY

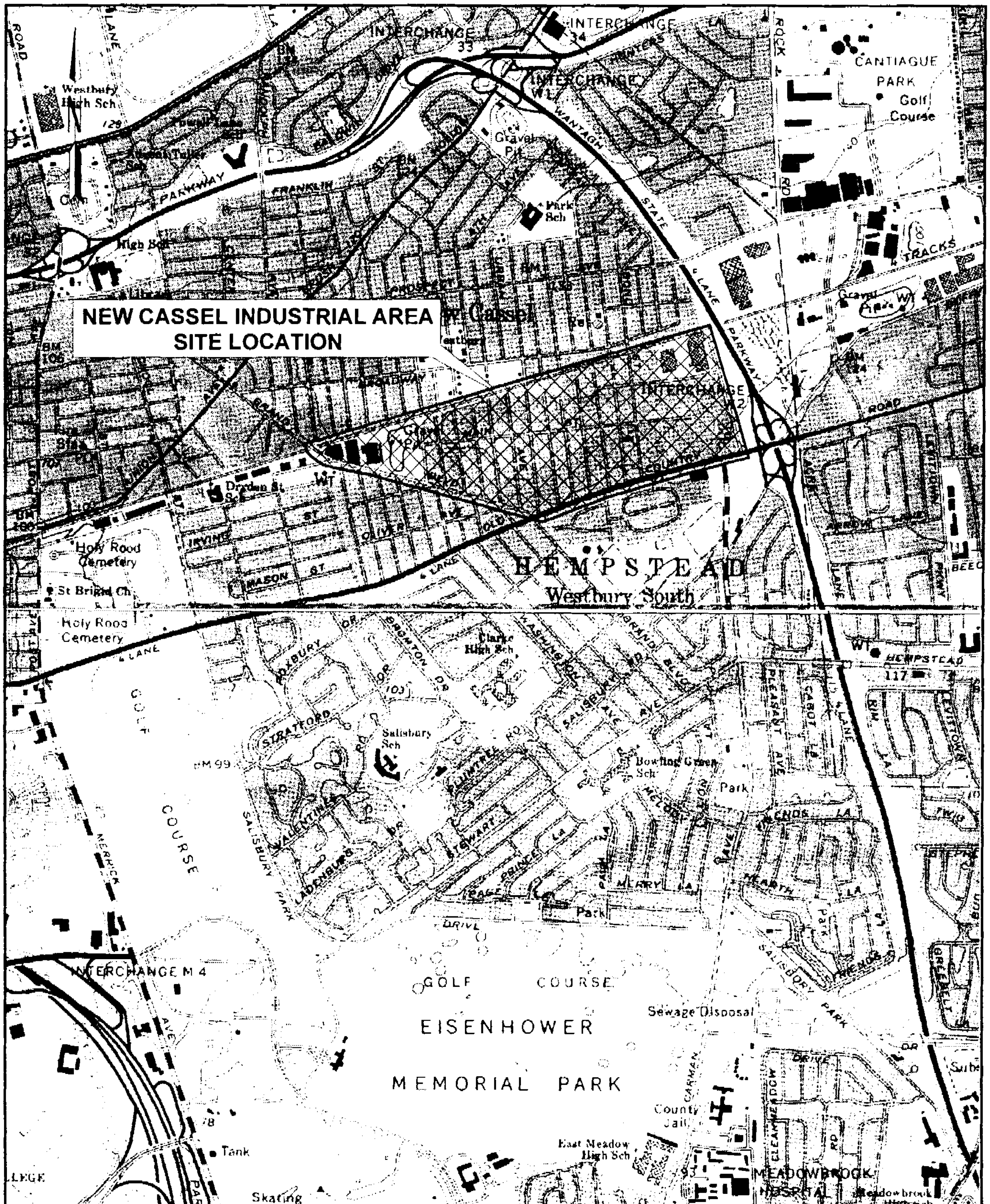
The New Cassel Industrial Area (NYSDEC Site No. 1-30-043) is located in the Town of North Hempstead, Nassau County (Figure 1-1). In 1986, extensive chlorinated solvent contamination (1,000 to 10,000 μg/l) was discovered in the upper glacial aquifer (UGA) and Magothy Aquifer, which underlie the NCIA. As a result of the Preliminary Site Assessments (PSAs) conducted by LMS (LMS 1996, LMS 1997), a total of 17 sites were listed as Class 2 hazardous waste sites on the New York State Registry of Hazardous Waste Sites. Since the completion of the PSA investigations, RI/FS's have been completed to address the on-site sources of contamination and to determine the nature and extent of the on-site groundwater contamination. The objectives of the Remedial Investigation/Feasibility Study (RI/FS) were to gather/summarize all of the groundwater data from sampling points within the on-site and off-site locations of the industrial area; collect/analyze new groundwater samples from locations primarily within the off-site locations to fill-in missing data on plume maps; and to evaluate remedial options for the off-site groundwater.

The NCIA is a heavily industrialized area of a variety of small to medium sized businesses covering about 25 blocks. The on-site NCIA is defined as the area bounded to the north by the Long Island Railroad, to the south by Old Country Road, to the east by the Wantagh Parkway and to the west by Grand Boulevard. The off-site locations are those areas downgradient (southwest) of the industrial area and that have groundwater impacted by contaminants migrating off of the on-site NCIA. In general terms, this area includes the commercial and residential areas south of Old Country Road and Grand Boulevard (Figure 1-2).

Remedial Investigation for the Off-Site Groundwater

The purpose of this RI was to complete additional groundwater sampling within the impacted area. These data were then summarized and compiled with all previous data to provide a comprehensive picture of the nature and extent of the groundwater contamination in the vicinity of the NCIA. The RI data also formed the basis for the development of the FS and the evaluation of possible remedial alternatives for the individual groundwater contaminant plumes.

The land surface in the vicinity of the NCIA site is essentially level with groundsurface elevations ranging from approximately 120 ft to 100 ft above mean sea level (msl). The



0 2000 ft

SCALE
1 in. = 2000 ft

Map source:
USGS 7.5-minute quadrangle series,
Freeport, NY, 1969, photorevised 1979,
Hicksville, NY, 1967, photorevised 1979.

NEW YORK STATE

QUADRANGLE LOCATION

Figure 1-1

New Casssel Industrial Area
Site Location

OFFSITE GROUNDWATER
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

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Pearl River, New York

Figure 1-2

Site Plan

OFFSITE GROUNDWATER
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

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Pearl River, New York

land in this area naturally has only a very gentle southward slope and the lack of relief has likely been enhanced in the area surrounding the site by grading done during construction of the large number of surrounding structures. The nearest sources of surface water are several small ponds in and around Eisenhower Memorial Park, approximately two miles southwest of the site. Based on an ecological communities classification system outlined by NYSDEC, the NCIA is entirely comprised of a terrestrial cultural community. The terrestrial cultural subsystem is defined by communities that are direct results of the influence of human activities. The climate of Long Island is moderated by its proximity to the ocean and land surfaces that are very close to sea level. Precipitation, distributed evenly through the year, averages about 44-in. per year.

Long Island regional geology consists of a significant thickness of unconsolidated sediments (Cretaceous and Pleistocene age) overlying Precambrian and Paleozoic basement bedrock consisting of gneiss, schist and granite at an average depth of approximately 1000-ft below sea level. The primary concern of this investigation is the two upper aquifers, the upper glacial aquifer and the Magothy Aquifer. The UGA is an unconfined aquifer consisting of poorly sorted sands and gravels. The Magothy is the sole source aquifer for the study area and consists of finer sand, silt and small amounts of clay. Following NYSDEC and USEPA regulations, both the UGA and Magothy are protected as sole source aquifers on Long Island. Depth to water is about 50 to 55 ft below the ground surface in the study area and the hydraulic gradient is approximately 0.0006 ft/ft to the southwest. In many area of the site the watertable is found below the top of the Magothy Aquifer and the UGA is unsaturated. The Bowling Green wellfield is located approximately 1200 feet downgradient of the NCIA. This wellfield consists of two high capacity public water supply wells that are completed in the lower Magothy Aquifer.

One of the initial tasks of the RI was to compile an Access database of all of the historical groundwater data for the NCIA. This data included the groundwater results from numerous investigations that have been conducted since the early 1980's in and around the NCIA.

The field investigation activities for the RI included the following field sampling activities:

- Three rounds of monitoring well sampling on existing wells in the area.
- Four rounds of sampling at the Bowling Green early warning wells.
- Completion of 4 new shallow monitoring wells in off-site locations.
- Completion of 4 hydropunch groundwater sampling locations.

LMS collected a total of 162 groundwater samples from the various sampling locations and submitted them to the NYSDEC contract laboratory for TCL VOC analysis. In addition to the VOC analysis, a subset of the samples collected during the third sampling round were analyzed for a number of parameters to evaluate the potential for monitored natural attenuation (MNA).

The groundwater analytical results showed concentrations of VOCs in excess of the Class GA groundwater standards in many of the samples that were collected. The groundwater samples that exhibited contamination had various halogenated volatile organic compounds (VOCs) including 1,1,1 trichlorethane (1,1,1-TCA), trichloroethylene (TCE), tetrachloroethylene (PCE), and the breakdown products of each compound.

Based on the results of the groundwater sampling and analysis past activities at the various sites within the NCIA has resulted in significant off-site groundwater contamination. The contamination has affected both the UGA and the upper zones of the Magothy Aquifer. The major conclusions drawn from the RI include:

- The source areas for the on-site groundwater and off-site groundwater contamination at the NCIA is clearly attributable to the individual facilities on the New York State Registry of Inactive Hazardous Waste Disposal Sites as Class 2 sites. Sampling conducted during this investigation and previous investigations has not identified any additional sources for this contamination, including any upgradient off-site sources.

- The area of historically impacted groundwater (Figures 5-5 to 5-8) indicates that three individual plume areas exist over the three depth intervals examined with the exception of the deepest sampled depth level (125 to 200 ft bgs) where only two apparent plume areas were found. The plume areas include one plume in the eastern portion of the NCIA, one plume in the central section of the NCIA and one plume in the western section of the NCIA. Each of the three plume areas are impacting the groundwater off-site.

- For each of the time periods which were examined, each of the plume areas at the shallow and intermediate depths appear to be generally of the same shape, size and magnitude of contamination. At the deepest depths, the data are limited and do not indicate an increasing plume size or increasing trend in contamination at depth.

- For those monitoring wells which have been sampled more than 6 times (40 of the 182 available wells), greater than 50% of the wells appear to have decreasing VOC concentrations. Thirty-seven percent of the wells continue to exhibit significant concentrations of VOCs, and of these approximately half show an apparent increase in VOC concentrations over the years. This suggests that although the concentrations of VOCs in the groundwater appear to be decreasing in a large percentage of the wells, a similar percentage of the wells have not show improvement or are increasing in concentration. Further analysis of the entire database indicates that naturally occurring breakdown of the parent compounds is not apparent, based on an evaluation of the relative percentages of the individual compounds to the total VOC concentration.

- The overall contaminant distribution is related to a number of factors at this site, which include:
  - The physical properties of the contaminants. The primary contaminants of concern are chlorinated solvents. As these compounds are present as non-aqueous phase liquids (NAPLs) on-site, a continuous source of contamination to off-site areas exists under present (2000) conditions. However, in the near future when proposed active remediation systems are installed at the on-site locations, these sources may no longer exist. These compounds are heavier than water in their pure form and will tend to sink into the aquifer. Overall these compounds do not appear to be rapidly breaking down in the aquifer.
  - Site geology and site hydrogeology including the influence of the Bowling Green production wells. The site geology and hydrogeology consists of a thick sequence of stratified unconsolidated sands, silts, and gravels. Only the deeper basal portion of the Magothy Formation is currently used as a source of raw public drinking water. Although the watertable is within the upper portions of the Magothy Aquifer, the fine-grained nature of the deeper portions of the aquifer appear to be limiting the downward migration of the contaminants. However, the presence of the Bowling Green supply wells produces a significant downward vertical gradient across these silts and clays in the deeper portion of the aquifer that tends to draw contaminants vertically downward. At this time, these silts and clays are the only factors that impede the migration of the contaminants to the supply wells.

- Currently, the only potential pathway of exposure to the groundwater contamination is through the Bowling Green water supply wells. Institutional controls at the supply wells insure that the actual drinking water is treated such that any contamination in excess of relevant standards is removed. There are no on-site pathways of exposure to the groundwater within the industrial area since no private or municipal water supply wells exist and the groundwater is not used in any other capacity.

Feasibility Study for the Off-Site Groundwater

A health exposure pathway analysis was conducted for the Frost Street sites to evaluate the baseline exposures to human health from the NCIA off-site groundwater contamination. Results of this health exposure pathway analysis were used to determine the need for remedial action at the sites and to select site remedial action objectives. Prior to the pathway analysis, chemical-, location-, and action-specific standards, criteria, and guidance (SCGs) were identified. Contaminants of concern (COCs) for the off-site groundwater were selected by reviewing the analytical data obtained in the RI and determining the frequencies of detection and ranges of detected concentrations of contaminants. A concentration-toxicity screening was then performed to identify those contaminants most likely to contribute significantly to the human health risk at the sites. COCs identified included VOCs (including PCE, TCE, and common breakdown products). No current or future exposure routes of significance were identified for the off-site groundwater contamination. In the future land use scenario, any resulting exposure pathways are expected to be of limited duration to individuals conducting excavation work (i.e., performing utility work) and can be appropriately addressed by using personal protective equipment and/or engineering control. No exposure pathways associated with site development or remedial activities (e.g., operation of in-situ groundwater systems) were identified for workers, site occupants, or visitors in the future. There were no current or future direct exposure pathways identified for COCs through groundwater ingestion, inhalation, or dermal contact by site occupants or visitors because institutional treatment controls are implemented by the Bowling Green Water District.

An FS was then conducted to address contamination in the off-site groundwater at levels exceeding the remedial action objectives. The initial step in the FS process was the identification and screening of potential remedial technologies. Potential technologies that address contaminated groundwater and air emissions (for purposes of evaluating possible air emissions from groundwater treatment systems) were identified and evaluated based on their feasibility, effectiveness in addressing site contaminants, and relative costs.

The technologies that were retained as applicable to project conditions and groundwater contaminants were then combined into a range of site-wide remedial alternatives. The alternatives were then developed to allow for a detailed evaluation of key tradeoffs among alternatives. The remedial alternatives were evaluated with respect to the EPA- and NYSDEC-specified criteria, which include overall protection of human health and the environment; compliance with SCGs; long-term effectiveness and permanence; reduction of toxicity, mobility, or volume of contamination through treatment; short-term effectiveness; implementability; and cost. Public comment on the remedial alternatives will be considered prior to final selection of a remedial action plan and will be addressed in the Record of Decision (ROD) for the site. Capital and long-term operations and maintenance (O&M) costs were estimated for each alternative, and the present worth of each alternative was calculated based on a 30-yr life and a 5% discount rate.

Eleven groundwater response alternatives were selected for inclusion in the detailed evaluation of alternatives. All of the alternatives developed for this FS considered that active source removal and groundwater remediation is in-place or planned at 13 source sites within the NCIA. The alternatives developed are as follows:

1. Alternative 1: No Further Action

Minimal prevention of human contact with off-site groundwater contaminants through institutional controls only. Contaminants remain in the environment, and groundwater SCGs are not quickly or actively achieved. Most inexpensive of the eleven alternatives (estimated present worth cost of $1.5 million).

2. Alternative 2: Monitored Natural Attenuation

Minimal prevention of human contact with groundwater contamination through institutional controls. Contaminants anticipated to remain in the groundwater for several years, as natural attenuation is relied upon to achieve groundwater SCGs. Alternative 2 ranks third out of the eleven alternatives in terms of lowest cost ($2.4 million).

3. Alternative 3: Monitoring, Assessment, and Contingent Remediation

Minimal prevention of human contact with off-site groundwater contaminants through institutional controls. Contaminants remain in the environment, and groundwater SCGs are not quickly or actively achieved. However, technical evaluations of groundwater data and remedial options (to be conducted annually) may lead to the implementation of an active remedy. Second most inexpensive of the eleven alternatives (estimated present worth cost of $2.2 million).

4. Alternative 4A: Remediation of Upper Portion of Aquifer (to 125 ft bgs) with In-Well Vapor Stripping / Localized Vapor Treatment

Alternative 4A employs in-well vapor stripping, an active remedy, to address groundwater contamination in the upper portion of the aquifer (to 125 ft bgs). Only "hot spot" areas are targeted with the active treatment system, and natural attenuation is relied on to help achieve SCGs. Alternative 4A ranks fourth out of the eleven alternatives in terms of cost ($2.8 million).

5. Alternative 4B: Remediation of Upper Portion of Aquifer (to 125 ft bgs) with Groundwater Extraction / Centralized Air Stripping and Vapor Treatment / Effluent Re-Injection

Alternative 4B utilizes groundwater extraction/air stripping (pump and treat) to address groundwater contamination in the upper portion of the aquifer (to 125 ft bgs). Only "hot spot" areas are targeted with the active treatment system, and natural attenuation is relied on to help achieve SCGs. Alternative 4B ranks eighth out of the eleven alternatives in terms of cost ($5.0 million).

6. Alternative 5A: Remediation of Upper and Deep Portions of Aquifer (to 200 ft bgs) with In-Well Vapor Stripping / Localized Vapor Treatment

Alternative 5A employs in-well vapor stripping to address groundwater contamination in the upper and deep portions of the aquifer (to 200 ft bgs). Only "hot spot" areas are targeted with the active treatment system, and natural attenuation is relied on to help achieve SCGs. Alternative 5A is the fifth most inexpensive groundwater alternative in the FS (estimated present worth cost of $3.6 million).

7. **Alternative 5B: Remediation of Upper and Deep Portions of Aquifer (to 200 ft bgs) with Groundwater Extraction / Centralized Air Stripping and Vapor Treatment / Effluent Re-Injection**

Alternative 5B uses a pump and treat system to address groundwater contamination in the upper and deep portions of the aquifer (to 200 ft bgs). Only "hot spot" areas are targeted with the active treatment system, and natural attenuation is relied on to help achieve SCGs. Alternative 5B ranks ninth in terms of alternative cost ($5.3 million).

8. **Alternative 6A: Full Plume Remediation of Upper Portion of Aquifer (to 125 ft bgs) with In-Well Vapor Stripping / Localized Vapor Treatment**

Alternative 6A addresses groundwater contamination in the upper portion of the aquifer (to 125 ft bgs) with in-well vapor stripping. A larger aerial extent of the off-site groundwater contamination is actively remediated in Alternative 6A (as compared to Alternative 4A). Alternative 6A is the sixth most inexpensive groundwater alternative (estimated present worth cost of $3.7 million).

9. **Alternative 6B: Full Plume Remediation of Upper Portion of Aquifer (to 125 ft bgs) with Groundwater Extraction / Centralized Air Stripping and Vapor Treatment / Effluent Re-Injection**

Alternative 6B addresses groundwater contamination in the upper portion of the aquifer (to 125 ft bgs) with groundwater extraction/air stripping. A larger aerial extent of the off-site groundwater contamination is actively remediated in Alternative 6B (as compared to Alternative 4B). In terms of cost, Alternative 6B ranks tenth out of the eleven groundwater response alternatives, with an estimated present worth cost of $7.1 million.

10. **Alternative 7A: Full Plume Remediation of Upper and Deep Portions of Aquifer (to 200 ft bgs) with In-Well Vapor Stripping / Localized Vapor Treatment**

Alternative 7A employs an in-well vapor stripping system to remediate groundwater contamination in the upper and deep portions of the aquifer (to 200 ft bgs). A larger aerial extent of the off-site groundwater contamination is actively remediated in Alternative 7A (as compared to Alternative 5A). Alternative 7A is the seventh most inexpensive groundwater alternative (estimated cost of $4.9 million).

11. Alternative 7B: Full Plume Remediation of Upper and Deep Portions of Aquifer (to 200 ft bgs) with Groundwater Extraction / Centralized Air Stripping and Vapor Treatment / Effluent Re-Injection

Alternative 7B addresses groundwater contamination in the upper and deep portions of the aquifer (to 200 ft bgs) with a pump and treat system. A larger aerial extent of the off-site groundwater contamination is actively remediated in Alternative 7B (as compared to Alternative 5B). Alternative 7B is the most expensive alternative evaluated in this FS, with an estimated present worth cost of $8.2 million.

Each of the groundwater response alternatives addresses the off-site groundwater contaminant plumes located downgradient of the NCIA. The active remediation systems proposed (i.e., Alternatives 4A through 7B) focus on treating the groundwater from the water table (located approximately 55 ft bgs) to 125 ft bgs (Alternatives 4A, 4B, 6A, and 6B) and to 200 ft bgs (Alternatives 5A, 5B, 7A, and 7B) to reduce elevated VOC concentrations in the upper and deep portions of the aquifer and prevent the plumes from spreading to further downgradient locations at significant concentrations.

CHAPTER 2

INTRODUCTION AND BACKGROUND

2.0 PURPOSE AND OBJECTIVES

The purpose of this groundwater RI is to determine the nature and extent of the groundwater contamination associated with the NCIA as a result of past disposal practices that have impacted the groundwater both on-site and off-site. The purpose of FS is to specifically address the remedial options for the off-site groundwater since any groundwater that is contaminated on-site will be addresses as part of the on-site groundwater remedial program. The objective of this RI/FS is to provide a comprehensive picture of groundwater contamination associated with the NCIA and to form the basis for the selection of off-site groundwater remedial actions. This RI/FS did not include any investigation or propose remedies of the contaminant sources or soil contamination at the Registry sites within the NCIA. On-site groundwater remediation and soil remediation will be part of the on-site remedial programs.

2.1 SITE LOCATION AND DESCRIPTION

The New Cassel Industrial Area (NYSDEC Site No. 1-30-043) is located in the Town of North Hempstead, Nassau County (Figure 1-1). Overall this groundwater RI/FS encompasses all on-site and off-site locations at the industrial area where impacts to the groundwater related to past disposal practices have been found. During the RI special emphasis was been placed on determining the impact to groundwater in off-site locations at the NCIA. The off-site locations are those areas downgradient (southwest) of the industrial area. In general terms this area includes the commercial and residential areas south of Old Country Road and Grand Boulevard. The NCIA is a heavily developed industrial and commercial area. Development in this area dates back to the 1950's and many of the properties have housed various business over the years. The areas along Old Country Road are primarily commercial with residential neighborhoods off each of the side streets to the south. The areas south of Grand Boulevard and the areas north of the NCIA are also residential areas.

2.2 SITE BACKGROUND

The NCIA contains numerous Registry sites as a result of past disposal practices of the various industries and businesses in the area. During the Preliminary Site Assessment (PSA) conducted by LMS (LMS 1996, LMS 1997) an extensive area of chlorinated solvent groundwater contamination was discovered in several area of the industrial area. The purpose of this RI is to complete three additional rounds of groundwater sampling on 50 on-site and off-site monitoring wells in the impacted area. The first and second round of sampling included 49 and 50 monitoring wells respectively, while the final round included a subset of 24 of these wells. In addition to the monitoring well sampling 4 monitoring wells and 4 hydropunch sampling locations were completed at off-site locations. This data was then summarized and compiled with all previous data to provide a comprehensive picture of the nature and extent of the groundwater contamination in the vicinity of the NCIA. The RI data also forms the basis for the development of the FS and the evaluation of possible remedial alternatives for the individual groundwater contaminant plumes.

2.3 REPORT ORGANIZATION

The RI/FS report is divided into two volumes and 12 chapters. Chapters 2 to 6 describe and summarize the RI, and chapters 7 to 12 describe the FS. The supporting documentation including the RI/FS data and field logs are arranged in appendices at the end of the report.

Volume I:

Chapter 1	Executive Summary
Chapter 2	Introduction and Background
Chapter 3	Field Investigation Procedures
Chapter 4	Physical Characteristics
Chapter 5	Nature and Extent of Contamination
Chapter 6	Summary and Conclusions of the Remedial Investigation

Volume II:

Chapter 7	Applicable Standards, Criteria, and Guidance
Chapter 8	Health Exposure Pathway Analysis
Chapter 9	Objectives of the Feasibility Study
Chapter 10	Identification and Screening of Technologies
Chapter 11	Development and Screening of Alternatives
Chapter 12	Detailed Evaluation of Alternatives

CHAPTER 3

FIELD INVESTIGATION PROCEDURES

3.1 INTRODUCTION

The RI field investigation included the installation of four new shallow monitoring wells and four hydropunch locations downgradient of the site. The monitoring well sampling program included three rounds of sampling in April and August 1999, and January 2000. The first two sampling rounds for the RI included sampling 42 existing monitoring wells surrounding the site, the four newly installed monitoring wells, and the four Bowling Green early warning wells to determine the extent and magnitude of groundwater contamination resulting from past practices at the NCIA. The third sampling round included a smaller subset of monitoring wells and the analytic testing included a number of parameters to evaluate monitored natural attenuation (MNA).

3.2 MONITORING WELL INSTALLATION

3.2.1 General Monitoring Well Details

Four new shallow monitoring wells were installed downgradient of the NCIA site from 5 April 1999 to 13 April 1999. Each of the wells were placed in various downgradient positions of the NCIA to supplement the existing monitoring well network (Figure 3-1). The monitoring wells were set in or just below the UGA at depths of approximately 70-ft bgs.

All of the newly installed wells were drilled using a 4.25-in. I.D. hollow-stem augers, as shown in Figure 3-2, and constructed from ten foot sections of threaded, flush-joint 2-in. Schedule 40 PVC (Figure 3-3). Each of the new wells was fitted with 10 feet of 10-slot sized Schedule 40 PVC screen. The sand filter pack surrounding the screened interval of each well consisted of No. 1 grade Morie sand installed to a minimum of 2 ft above the top of the screen a bentonite well seal was then installed above the sand pack. Since the well seal was above the water table a layer of bentonite pellets at least 2-ft thick was added to the annulus of the well and hydrated with water. After installing the sand pack and bentonite

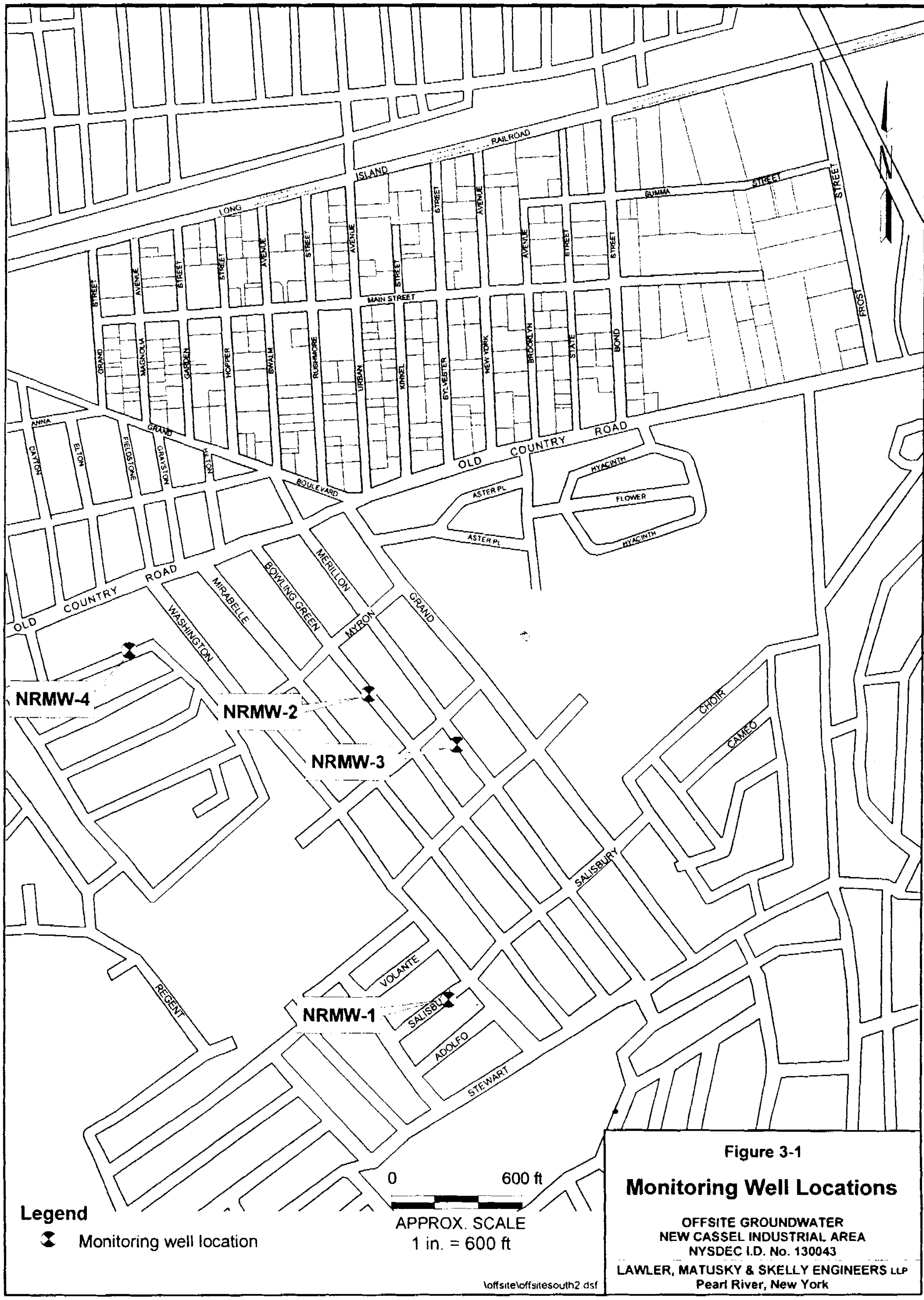

Figure 3-1

Monitoring Well Locations

OFFSITE GROUNDWATER
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

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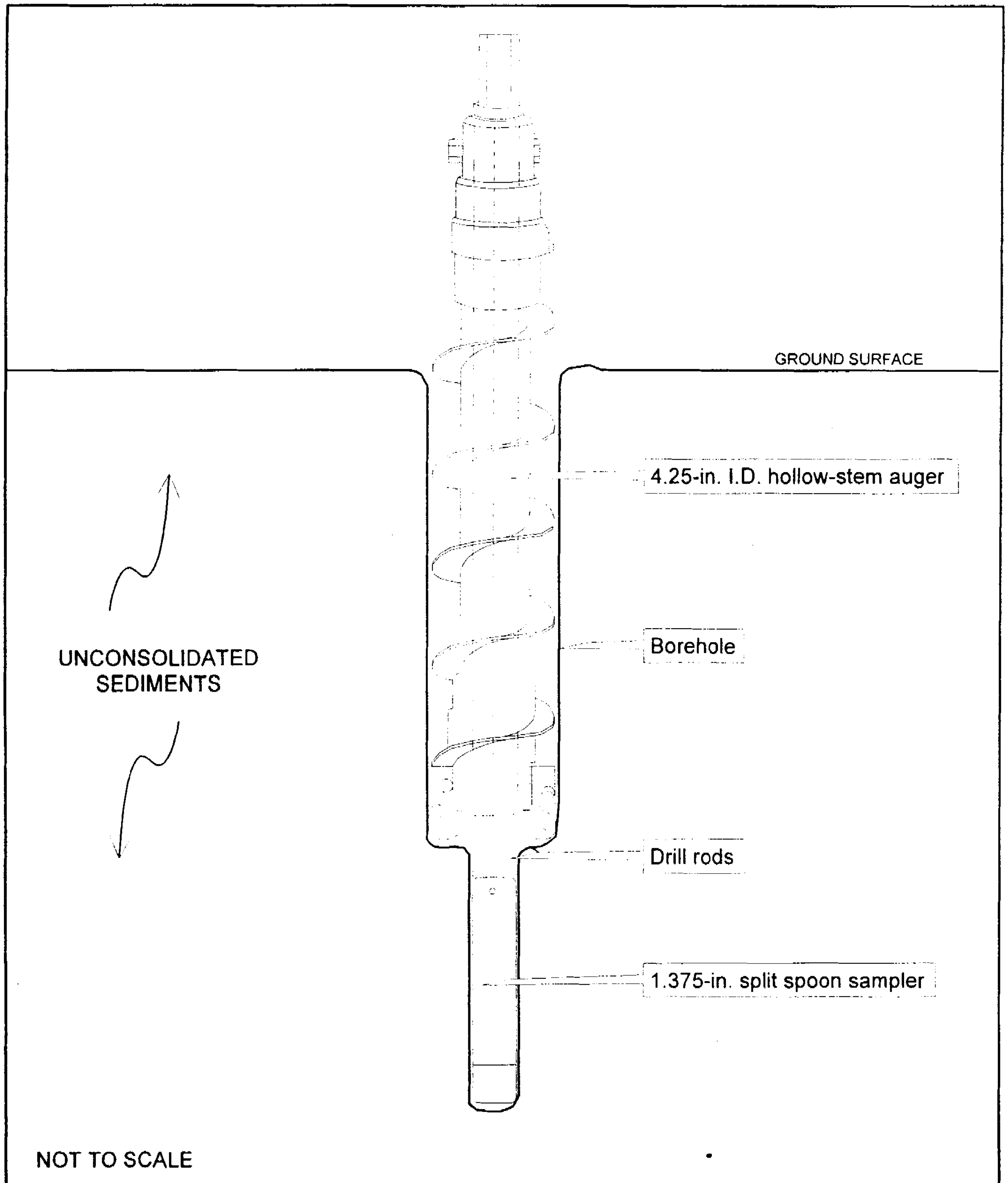
Pearl River, New York



\offsite\boring xsection and well const.dsf

Figure 3-2

Test Boring/Sampling Cross Section

OFFSITE GROUNDWATER
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

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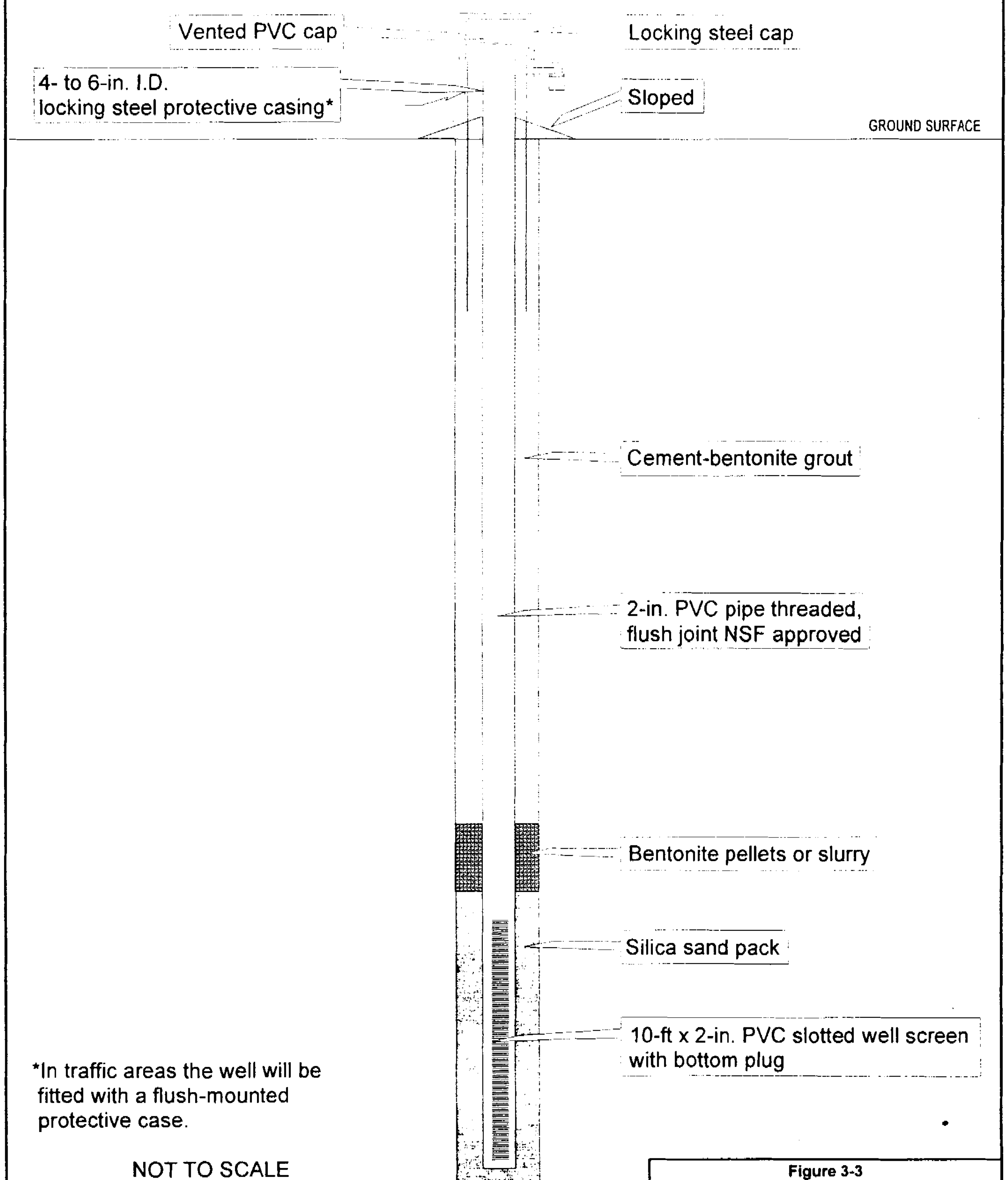
Pearl River, New York

R2-0000365



*In traffic areas the well will be fitted with a flush-mounted protective case.

NOT TO SCALE

\offsite\boring xsection and well const.dsf

Figure 3-3

Typical Overburden Monitoring Well Construction

OFFSITE GROUNDWATER
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

R2-0000366

seal the remaining volume of the borehole was filled to just below the surface with a bentonite and cement grout. The remainder of the borehole was filled with clean sand to provide adequate drainage around the protective case. Finally, a flush mounted well cover was installed with a surrounding cement pad. All cuttings from the drilling of the wells were containerized for later disposal in a 15 cubic yard covered roll-off located at the Bowling Green wellhead. Installation details for each well can be found in the monitoring well completion logs in Appendix A. Once the monitoring wells were installed a New York State licensed land surveyor established the location and elevation of each of the wells.

3.2.2 **Monitoring Well Soil Sampling**

During installation of each of the wells soil samples were collected using a 1.375-in I.D. split spoon sampler (Figure 3-2). The sampler was driven with either a 140-lb or 175-lb hammer in accordance with the standard penetration test method ASTM-D 1586. Samples were collected in 2-ft runs at 5-ft intervals from the ground surface to the bottom of the well boring. Upon recovery of the split spoon sample the soil was immediately scanned for VOCs using an FID or PID and the reading (relative to background), sample interval, soil description, blow counts, moisture content, color and evidence of contamination entered on a test boring log. Field boring logs and monitoring well completion logs are contained in Appendix A. Portions of each sample were bagged and labeled for field reference and comparison purposes while drilling the other wells but no split spoon samples were sent off-site for chemical analysis

3.2.3 **Specific Monitoring Well Details**

Specific monitoring well details are listed in Table 3-1 and water level data can be found in Table 3-2. All four of the newly installed wells were developed after installation. The new wells were allowed to set at least 24-hrs before development. All development was done using a 2-in. submersible pump. The development water was pumped into a 55-gal holding tank before being discharged under permit into a Nassau County sewer line. The monitoring well development was completed on 13 April 1999. Groundwater parameters such as pH, specific conductivity, temperature and turbidity were measured and logged during development. Development of the four new monitoring wells was done until the well had been pumped for three hours or the turbidity measured less than 50.0 NTUs. All four

TABLE 3-1

MONITORING WELL SUMMARY
NCIA OFF-SITE WELLS

Well I.D.	Total Depth (ft)	Screened Interval (ft)	Riser material	Riser length (ft)	DTW (ft)	Filter pack	Seal	Protective case
NRMW-1	70	60-70	PVC (2")	60	40.6	#1 sand	bentonite	flush mount cap
NRMW-2	70	60-70	PVC (2")	60	44.45	#1 sand	bentonite	flush mount cap
NRMW-3	70	60-70	PVC (2")	60	40.2	#1 sand	bentonite	flush mount cap
NRMW-4	70	60-70	PVC (2")	60	42.25	#1 sand	bentonite	flush mount cap

TABLE 3-2

GROUNDWATER ELEVATIONS

NCIA OFF-SITE WELLS

Well I.D.	Groundwater elevation (ft MSL) (4/15/1999)	Groundwater elevation (ft MSL) (4/20/1999)	Groundwater elevation (ft MSL) (8/10/1999)	Groundwater elevation (ft MSL) (1/11/2000)
NRMW-1	66.41	66.36	63.33	63.48
NRMW-2	68.25	68.27	65.26	63.70
NRMW-3	68.04	68.13	64.95	65.56
NRMW-4	67.78	67.81	65.03	65.24

new monitoring wells were developed at a rate of approximately 4-gal/min and turbidity levels stabilized to less than 50 NTUs in approximately 1 hour. The monitoring well development logs are found in Appendix B.

3.2.4 **In-situ Hydraulic Testing**

Slug tests were performed on each of the new monitoring wells to characterize the hydraulic conductivity of the aquifer in which they were screened. The slug test relates the response of the aquifer to an artificial change in water level at the monitoring well over time. A pressure transducer was first lowered into the water column in the monitoring well to a level well below that of the static water level and carefully fixed at that level to prohibit any movement. The transducer and water level were allowed to equilibrate and a stainless steel slug was lowered into the well to a point just above the top of the water column. At that point the static water level was set to be the reference level for the transducer. From this point any fluctuation in water level was displayed as a positive or negative displacement relative to the reference water level. The slug was then lowered instantaneously into the water, displacing an equal volume of water and raising the water level. At the moment the slug was lowered the Hermit data logger was activated to record the change in water level detected by the pressure transducer through time. The Hermit logger coupled with the transducer made it possible to record a large number of water level measurements in a short period of time. This was especially important in the wells tested since the UGA is highly permeable and exhibit very rapid recovery after being stressed. The Hermit logger was set to collect data on a logarithmic time scale such that many measurements were taken early in the test and the frequency of measurement would decrease with time. Once it was apparent that the water level had fully recovered (approximately 10 minutes) the data logger was stopped and programmed for the next phase of the test that involved the removal of the slug from the water column. The data logger was started and the slug was quickly pulled out of the water and the recovery response was again logged for about 10 minutes.

Data from the slug tests were downloaded from the Hermit logger to a PC and used in AQTESOLV, a hydraulic testing analysis program. AQTESOLV utilized the Bouwer-Rice method and a graphical solver to calculate the hydraulic conductivity of the aquifer based on the data collected in the field. Appendix C contains the graphical presentation of the in-situ hydraulic testing data and results from analysis of these data.

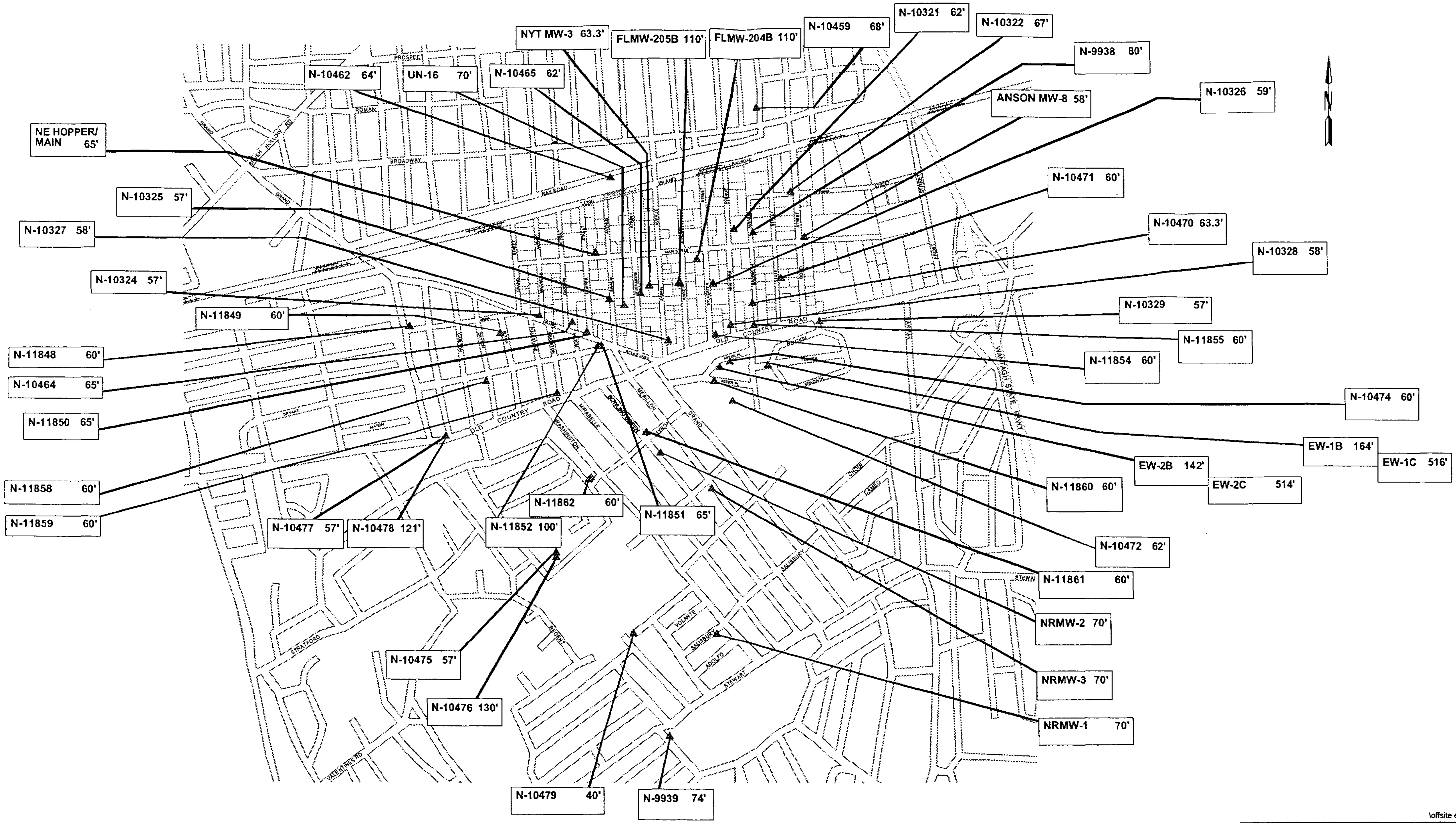
3.3 MONITORING WELL SAMPLING AND ANALYSIS

3.3.1 Groundwater Sampling Protocol

Groundwater sampling was conducted at series of 50 wells surrounding the NCIA site during three separate sampling rounds (Figure 3-4 to Figure 3-6). The existing wells included wells installed by Nassau County, the USGS, NYSDEC, and several individual property owners. Specific details on the well locations, construction information, and sampling information are found in Appendix D. In addition to the 41 existing wells in the area, the 4 newly installed wells and the 4 Bowling Green early warning wells were also sampled during the April 1999 RI Field activities. A second sampling round of the same subset of wells and sampling protocol as the first round was conducted in August 1999 (Figure 3-5). During the second round one additional monitoring well was added so that a total of 50 groundwater samples were collected. The final round of monitoring well sampling was conducted January 2000 (Figure 3-6) and included a reduced subset (24 monitoring wells) of the monitoring well network.

Prior to sampling, each monitoring well was purged to remove the standing water inside the well. A minimum of three well volumes was removed to insure that water being sampled was representative of that contained in the aquifer. Purging of shallow wells with water column heights less than ten feet was done by hand bailing due to the small amount of purging necessary. The intermediate and deep wells often had larger water columns requiring prohibitive lengths of time to hand bail the required amounts of water. These wells were purged using a 2" Grundfos submersible pump or other similar submersible pump. During purging of the wells, pH, conductivity, temperature and turbidity were monitored at intervals determined by the amount of water necessary for adequate purging. In January, alkalinity, chloride, dissolved oxygen, oxidation-reduction potential (ORP), hardness, and Fe^{2+} were also monitored during purging. All purge water was containerized in a large plastic holding tank for transport to a pre-determined Nassau County sanitary sewer manhole.

Groundwater samples were collected after purging using dedicated Teflon bailers. At each well 40-ml pre-cleaned glass vials were filled for VOC analysis. Sampling parameters (pH, conductivity, temperature and turbidity) were measured and recorded on a sampling log at the beginning and end of sampling at each well. The deep Bowling Green early warning wells were sampled using the same sample procedures with the



LEGEND:

Well ID	Depth
N-10479	40'

Well Location ▲

0 1200 ft

Approximate Scale
1 in. = 1200 ft

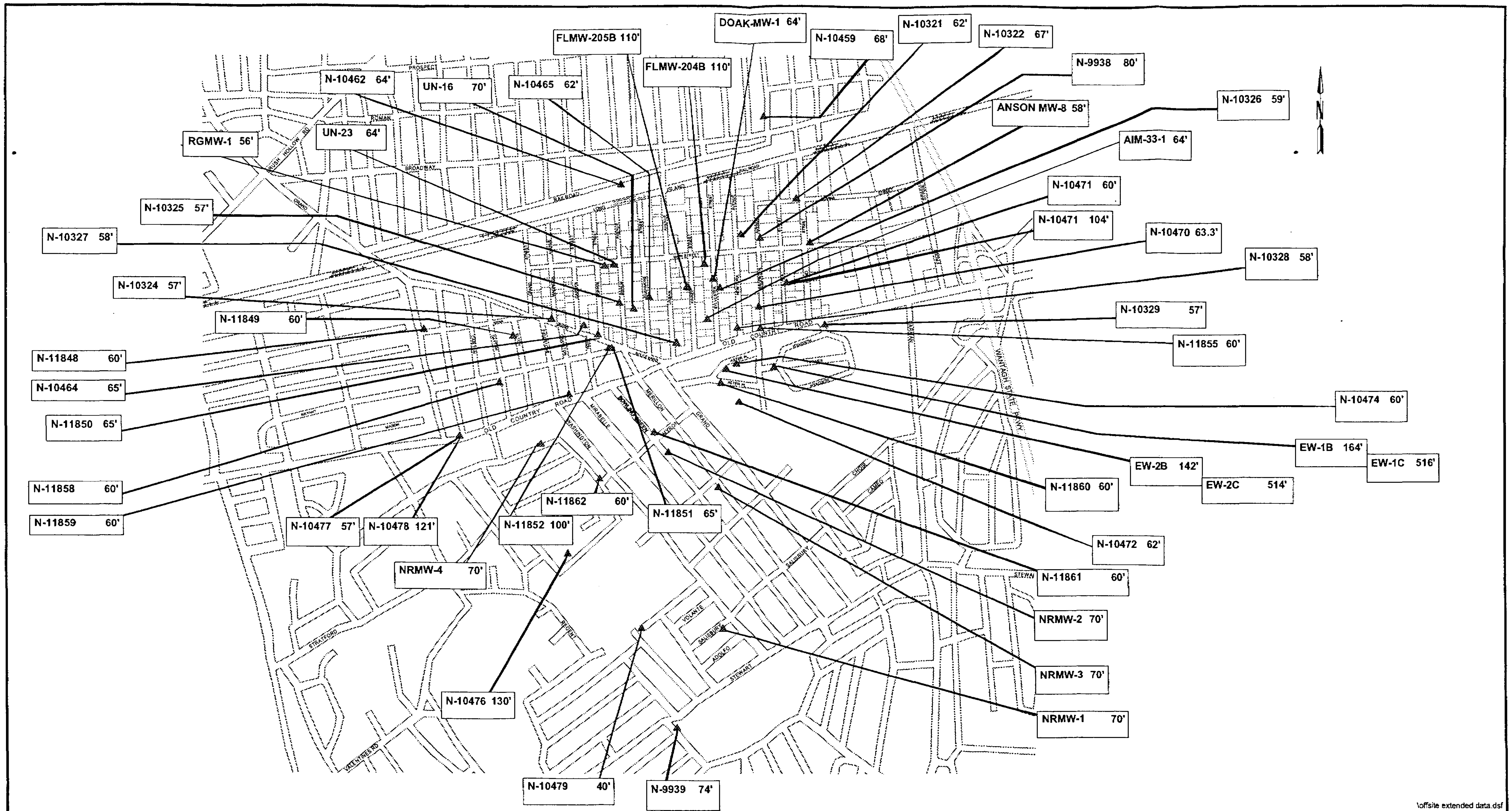
Figure 3-4

Monitoring Wells Sampled April 1999 (Round 1)

OFFSITE INVESTIGATION
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

R2-0000372



\offsite extended data.dsf

LEGEND:

Well ID	Depth
N-10479	40'

▲ Well Location

0 1200 ft
Approximate Scale
1 in. = 1200 ft

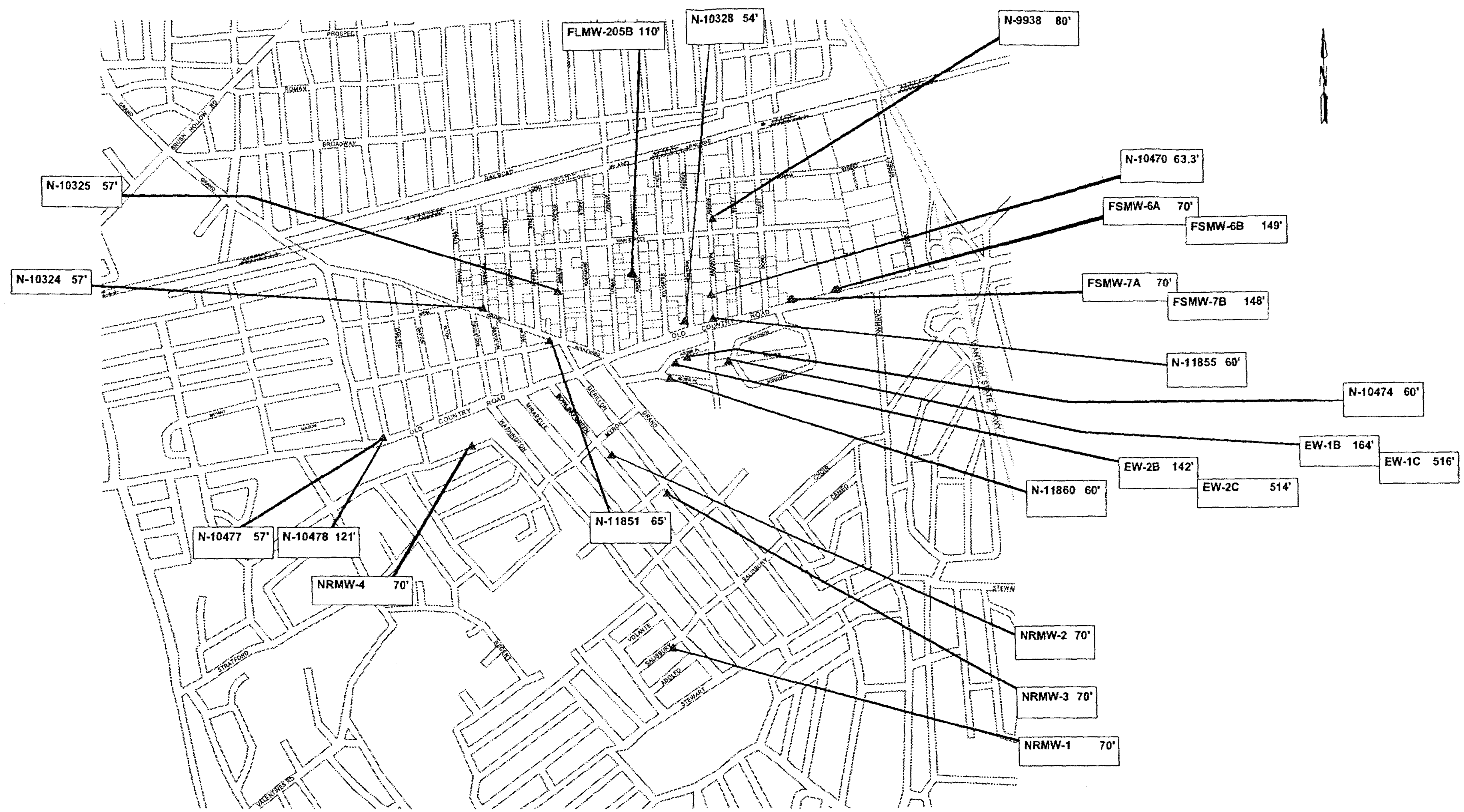
Figure 3- 5

Monitoring Wells Sampled August 1999 (Round 2)

OFFSITE INVESTIGATION
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

R2-0000373



\offsite extended data.dsf

LEGEND:

Well ID Depth

N-10479	40'

Well Location ▲

0 1200 ft

Approximate Scale
1 in. = 1200 ft

Figure 3- 6

Monitoring Wells Sampled
January 2000 (Round 3)

OFFSITE INVESTIGATION
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

exception that the samples were collected directly from the dedicated pump after the appropriate purging period. QA/QC samples, including field blanks, matrix spike and matrix spike duplicate, and a blind duplicate, were also collected. Upon collection of samples they were immediately packaged in protective wrap and placed in a secure, ice-filled cooler for storage in the field. At the end of each day all samples were logged on an appropriate chain of custody record and carefully packaged on ice. All groundwater samples were hand delivered to H2M Laboratories for TCL VOC analysis under direct contract to the NYSDEC. Groundwater samples collected in January 2000 were also submitted for methane, ethane, ethene, arsenic, total iron, manganese, sulfate, nitrate, and total organic carbon (TOC) analyses.

3.4 HYDROPUNCH GROUNDWATER SAMPLING

3.4.1 General Hydropunch Details

Four hydropunches were installed downgradient of the NCIA site from 17 January to 11 February 2000. Each of the hydropunches were placed in various downgradient positions of the NCIA including one hydropunch immediately downgradient of the Bowling Green production wells (Figure 3-7). The hydropunches were sampled from the groundwater table (approximately 60 ft) in ten-ft increments down to 150 ft bgs.

All of the hydropunches were drilled using 4.25-in. I.D. hollow-stem augers, as shown in Figure 3-2. After the hydropunch was completed, the augers were removed and the borehole was filled to the surface with a cement/bentonite grout. All cuttings from the drilling of the hydropunches were containerized for later disposal in a lined, covered, low-profile roll-off located at the Bowling Green wellhead. Boring logs for each hydropunch can be found in Appendix A.

3.4.2 Hydropunch Soil Sampling

Soil samples were collected using standard ASTM-D 1586 methods as described in Section 3.2.2. Boring logs completed during the installation of the hydropunches are contained in Appendix A. None of the soil samples collected from the split spoons were sent off-site for chemical analysis.

3.4.3 Specific Hydropunch Details

Groundwater samples were collected at the water table (approximately 60 ft), in ten-ft

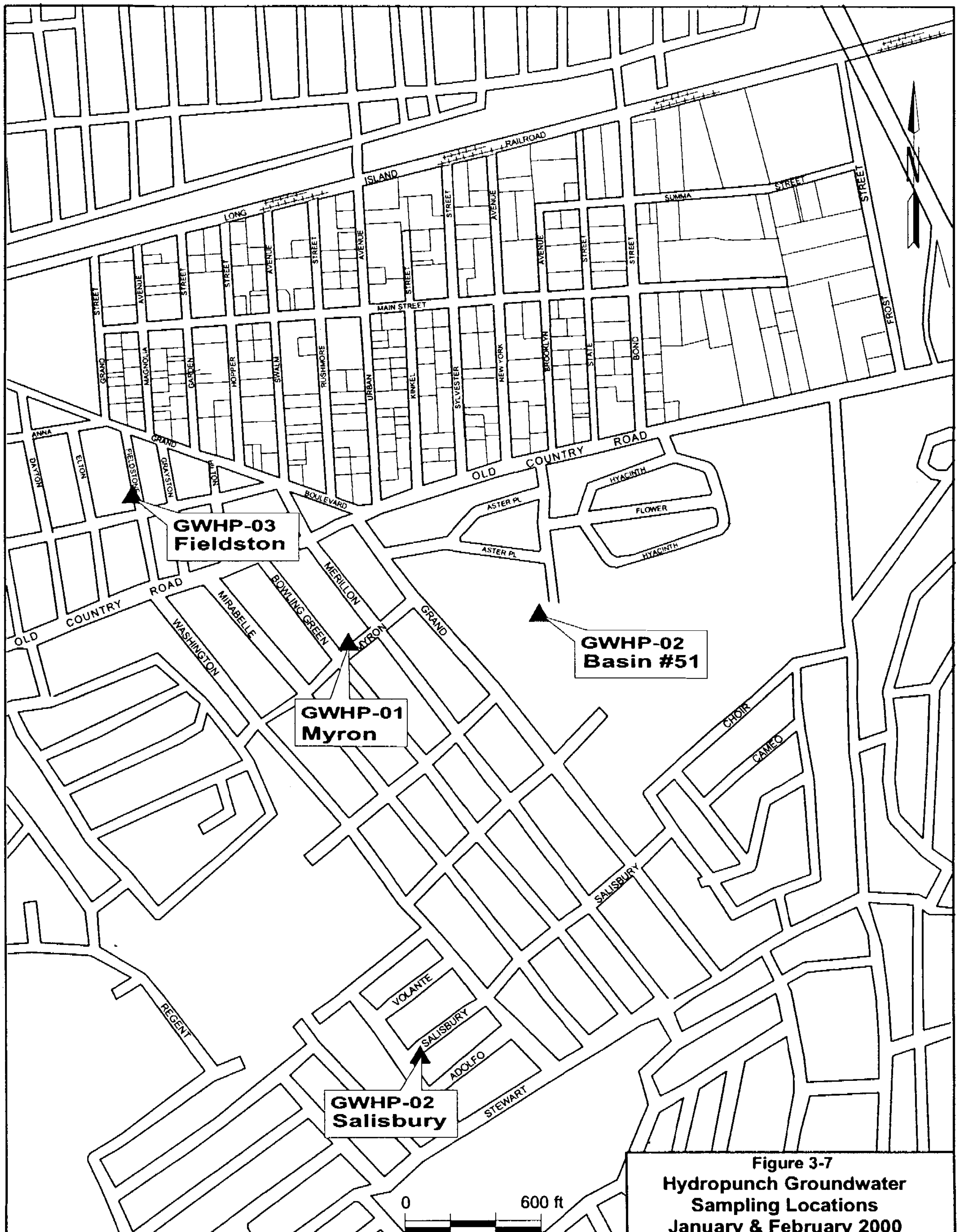


Figure 3-7
Hydropunch Groundwater Sampling Locations January & February 2000
OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

Legend

▲ Hydropunch location

\offsite\offsitesouth2.dsf

increments down to 150 ft bgs using a hydropunch sampling system. A total of 39 groundwater samples were collected during the hydropunch sampling, only one of the sampling attempts failed to recover enough groundwater for sampling purposes.

The drilling rods were removed from the boring at each of the specified sampling depths and a steam-cleaned hydropunch tool attached to the rods. The rods were then lowered back into the boring and the hydropunch driven to the targeted sampling depth. Once the hydropunch tool was driven to the desired depth, it was retracted several inches to expose the sample port. The hydropunch tool was then allowed to fill with the groundwater sample. Once the hydropunch tool was filled, it was returned to the surface and the groundwater sample was transferred to laboratory-cleaned glass VOC vials, labeled with the appropriate sample location, interval, date, time, sampler, and required analyses. Each of the groundwater samples were hand delivered to H2M Laboratories for analysis under direct contract to the NYSDEC.

Upon completion of the hydropunch sampling, the boreholes were grouted with Type 1 Portland cement and betonite mixture. The ground surface above the borehole was then repaired with asphalt patch.

3.5 RELATED FIELD INVESTIGATION PROCEDURES

3.5.1 Decontamination

All equipment that came into direct contact with potentially contaminated soils, sediments, and groundwater was decontaminated before being removed from the site. In addition, equipment used for the installation of soil borings was decontaminated between each boring location to prevent cross-contamination. Downhole equipment used during the construction of the monitoring wells and hydropunches was steam cleaned.

Equipment decontamination procedures used at each site consisted of the following steps:

- Physically removed packed dirt, grit, mud, and debris with a wire or soft bristle brush.
- Scrubbed all potentially contaminated surface areas with a water/detergent solution.
- Rinsed off scrub solution with a potable water rinse.
- Allowed to drip and air dry on-site.
- Scanned equipment with a PID or FID to assure the absence of contamination

prior to removal from the site.

3.5.2 Waste Handling and Disposal

Investigation derived wastes (IDW) included disposable personal protective equipment (PPE), soil cuttings, decontamination rinse water, well development water, and general trash. These wastes were handled as described below.

3.5.3 Soil Cuttings from Hydropunch Sampling

The drilling cuttings were containerized for off-site disposal since these areas are developed and suitable locations to disperse soil cuttings were not available. A lined, covered, low-profile roll-off was staged in the Bowling Green wellhead area to store these materials until LMS completes analytical testing on the materials. After analytical testing determines the classification of the cuttings (hazardous, contaminated, or clean) the cuttings will be disposed of properly. Disposal options include:

- Disposal as clean fill.
- Disposal at an industrial waste landfill if soils are non-hazardous, but exceed cleanup criteria.
- Disposal at an approved treatment, storage, and disposal (TSD) facility if soils exceed hazardous criteria.

3.5.4 Decontamination Water

Water generated from the decontamination of equipment and personnel was discharged to the ground surface.

3.5.5 Disposable Personal Protective Equipment (PPE) and General Trash

Used PPE and other trash was stored in appropriate trash bags on site. Upon completion of the field activities, the trash generated was transported back to an LMS facility for proper disposal.

3.5.6 Site Restoration

LMS and its subcontractors restored any damaged grass or landscaped areas. All boreholes were patched using cold patch or concrete. No further site restoration was required by the NYSDEC.

CHAPTER 4

PHYSICAL CHARACTERISTICS

4.1 TOPOGRAPHY

The land surface in the vicinity of the NCIA site is essentially level with groundsurface elevations ranging from approximately 120 ft to 100 ft above mean sea level. The land in this area naturally has only a very gentle southward slope and the lack of relief has likely been enhanced in the area surrounding the site by grading done during construction of the large number of surrounding structures.

4.2 SURFACE WATER

The nearest sources of surface water are several small ponds in and around Eisenhower Memorial Park, approximately two miles southwest of the site. Typically, this area of Long Island does not have many surface water bodies due to the highly permeable subsurface material and depth to groundwater, precipitation quickly infiltrates into the subsurface.

4.3 DEMOGRAPHY AND LAND USE

The NCIA site is located in the town of North Hempstead (Nassau County, New York). Based on the 1990 census the population of the county is 1.3 million and of North Hempstead about 200,000 (U.S. Department of Commerce, 1990). The NCIA is a heavily industrialized area with a variety of small to medium sized businesses covering about 25 blocks. The NCIA is bounded to the north by the Long Island Railroad, to the south by Old Country Road, to the east by the Wantagh Parkway and to the west by Grand Boulevard. For miles east and west of the NCIA, along Old Country Road, commercial property dominates while land use north and south of the area consists primarily of residential property.

4.4 ECOLOGY

Based on an ecological communities classification system outlined by NYSDEC the NCIA is entirely comprised of a terrestrial cultural community. The terrestrial cultural subsystem is defined by communities that are direct results of the influence of human activities or are modified to such an extent as to be significantly changed from the community as it was before alteration by humans (NYSDEC, 1990).

From the classification system utilized by the NYSDEC, five ecological communities dominate the NCIA. The first community (NYSDEC terrestrial cultural community #16) accounts for approximately 20% of the NCIA and is characterized by roads and paths paved with asphalt, concrete, brick and stone with only sparse vegetation present in cracks in the surface. Junkyards (NYSDEC terrestrial cultural community #30) that have been utilized for storage of refuse are another component of the NCIA ecology and account for approximately 10% of the NCIA. Urban vacant lots (NYSDEC terrestrial cultural community # 31) comprise about 10% of the NCIA. These lots are characterized by debris laden, sparsely vegetated open sites within a developed area where construction is pending or demolition has occurred. Urban structure exteriors (community #32) and interiors of non-agricultural buildings (community #35) compose the majority of the NCIA. Approximately 35% of the area is made up of the interior of non-agricultural buildings, including those used for commercial or industrial purposes. Urban structure exteriors make up approximately 25% of the area of the NCIA and include exteriors of commercial buildings or any inorganic structural surface. Typically, only sparse vegetation is present but birds and insects are common. (NYSDEC, 1990)

4.5 CLIMATOLOGY

The climate of Long Island is moderated by its proximity to the ocean and land surfaces that are very close to sea level. Precipitation, distributed evenly through the year, averages about 44-in. per year with a range between approximately 32 and 58-in. per year. Rainfall amounts reach a maximum in August with 3 to 4.5 inches recorded in a typical year. Temperatures range from an average low of 32°F in January to an average high of about 75°F in July. The average annual temperature on Long Island over an 85 year period is 52.7°F (USGS, 1963).

4.6 SOILS

The soils in the area around the NCIA are medium - coarse grained, well drained soils of the Haven Variant association. This association is typically a deep soil formed on the nearly level land (0-3%) of the southern outwash plain. At depths between 20 to 36 inches the loamy, upper soils are underlain by stratified sands and gravel. The upper soil material is moderately permeable while the deeper sand and gravel has a very high permeability (USSCS, 1976).

4.7 GEOLOGY

4.7.1 Regional Geology

Long Island regional geology consists of a significant thickness of unconsolidated sediments (Cretaceous and Pleistocene age) overlying Precambrian and Paleozoic basement bedrock consisting of gneiss, schist and granite that forms the base of Long Island (Figure 4-1). The bedrock surface is found at an average depth of approximately 1000-ft below sea level and dips southward to the south shore of the island (USGS, 1989).

Directly above the bedrock lies the Raritan Formation, composed of the lower Lloyd Sand Member and an upper confining layer of clay. The Lloyd Sand Member is one of three important aquifers in the study area and consists of poorly sorted quartzose sands and gravel. The top of the Raritan Formation is encountered at an average depth of approximately 400-ft below sea level with a maximum thickness of about 700-ft (USGS, 1989).

Unconformably overlying the Raritan Formation is the Magothy Formation, consisting of interbedded lenses and layers of fine to medium sand, clayey sand and solid clay with a basal gravel zone. The Magothy is the major aquifer for public supply to nearly all of Long Island. The depth of the upper surface of the Magothy is found at about 100-ft below sea level and the formation thickens to the south, reaching a maximum thickness of 1100-ft in some locations.

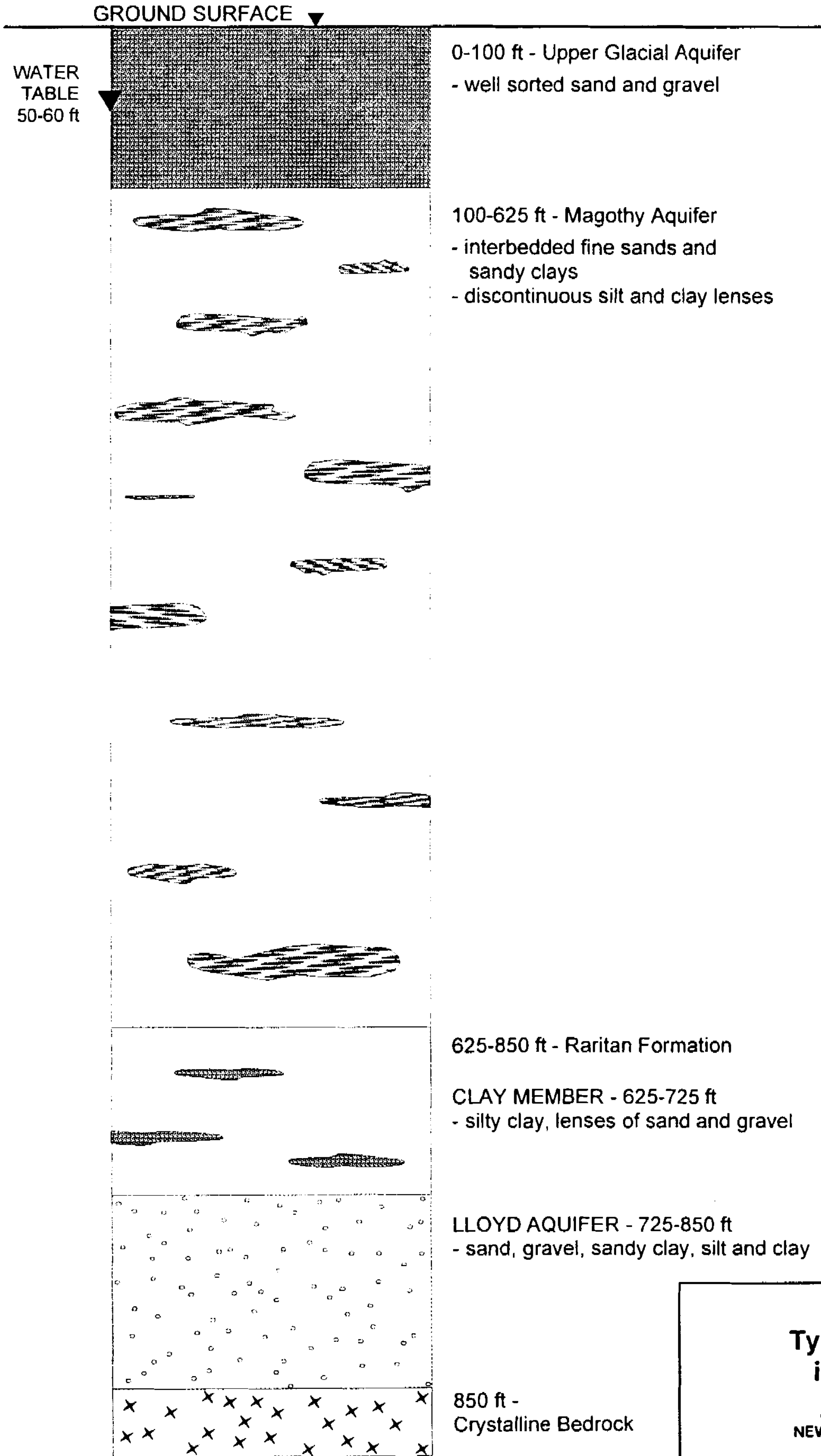


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Figure 4-1

Typical Cross Section in the Site Vicinity

OFFSITE GROUNDWATER
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

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Pearl River, New York

What lies above the Magothy Formation is a function of the geographical location on the island. In eastern Nassau County and Suffolk County the Monmouth greensand, a glauconitic greenish-grey to greenish black sand, silt and clay overlies the Magothy. This member acts as an upper confining unit for the Magothy, however, it has a very limited areal extent, pinching out about three miles inland from the south shore and disappearing altogether at the far eastern end of the island. Further west, in Kings and Queens counties, the Jameco Gravel, a mix of poorly sorted sands and small gravel, can be found in a layer approximately 100-ft thick extending from the south shore to the middle of the island (USGS, 1989).

The Gardiners Clay is another confining unit for the Magothy Formation or Jameco Gravel (if present) but it also has a relatively small areal extent. The occurence of the Gardiners Clay is limited to the south shore of the island, pinching out 5 to 10 miles inland from the shore. As the name implies, the Gardiners is characterized by greyish-green, glauconitic, silty clay with a maximum thickness of approximately 150-ft (more typically about 50-ft) (USGS, 1989).

Above the Gardiners Clay or the Magothy (where the Gardiners is absent) are upper Pleistocene deposits of clay, sand, gravel and boulders commonly referred to as the UGA (upper glacial aquifer). These deposits are composed of glacial till (morainal materials to the north and outwash deposits to the south) and constitute another important water source for the island (Buxton and Modica, 1992).

4.7.2 **Study Area Geology**

The geology underlying the NCIA site in east-central Nassau County is somewhat simpler than the regional geology detailed above. The upper Pleistocene deposits of poorly sorted sands and gravel that make up the UGA are found from the surface to a depth of approximately 50 to 70-ft below the surface. The site is located far enough north and east in Nassau County such that the Gardiners Clay, Jameco Gravel and Monmouth greensand are all absent between the UGA and the underlying Magothy Formation. In general, the upper surface of the Magothy Formation is found at least 100-ft below ground surface (USGS, 1989). However, based on observations made during installation of wells for this investigation and on published cross sections of the area (USGS, 1989), the Magothy is fo..nd at significantly shallower depths (50 to 70-ft bgs) in the Westbury (New Cassel) area than in many other areas of the island. The available data indicates that an abrupt contact from glacial sands and gravels to the Magothy Formation does not exist in this area. Rather than an abrupt contact, a transition zone exists which is composed of glacial sands and reworked Magothy sediments. In describing the stratigraphic sequence these sediments should be included within the Pleistocene deposits, however the deposits in the transition zone likely exhibit hydraulic characteristics which are similar to the upper portions of the Magothy Formation.

The nature of the materials collected in split spoons during installation of the four new monitoring wells (NRMW-1 to NRMW-4) was relatively consistent. In each of the wells, with the exception of NRMW-4, tan/orange sands and gravels were found to approximately 60 ft. These sands and gravels are believed to be upper Pleistocene sediments, below 60 feet the deposit contained a higher percentage of fine sand and silts to the completion depth of the well at 70 feet. These deposits are interpreted as being within the transition zone from the upper Pleistocene sediments to the Cretaceous sediments (Magothy Formation). In NRMW-4 the Cretaceous deposits were found at a much shallower depth at between 40 and 45 ft. below the ground surface. At this location a more noticeable change from sands and gravels to silts and colored clay were found in the recovered split spoons. Split spoons recovered during the hydropunch sampling showed a trend similar to that observed in the monitoring wells. The coarse upper Pleistocene sands and gravels graded into a finer sand and silt between 60 and 90 feet. Once below 90 to 100 feet the materials were characteristic of Cretaceous sediments containing a larger percentage of silt and clay. In many instances the deposit is composed of a laminated sand, silt and clay.

Additional subsurface explorations deeper than 150 ft. were not conducted as part of this RI. During previous investigations, two borings were advanced into the lower basal portion of the Magothy formation and both Bowling Green wells were logged during the their construction. The available logs indicate that the formation tends to fine with depth below 150 ft. A generalized description of the sediments below 150 ft includes multiple layers of fine sand, silt, and clay that extend to a depth of approximately 450 feet. The basal portion of the formation consists of sand, silts, and gravels typical of a high-energy depositional environment. The sediments found within the study area appear to conform to the regional description and depositional history of the formation.

4.8 HYDROGEOLOGY

4.8.1 Regional Hydrogeology

As outlined in the description of the regional geology of the area, there are three principal aquifers in the stratigraphic sequence of Long Island (Figure 4-1). The deepest of these aquifers is the Lloyd Sand member of the Raritan Formation, which is confined on the bottom by the metamorphic and igneous basement rock and by the overlying Raritan confining unit. The Lloyd is characterized as poorly to moderately permeable with hydraulic conductivities on the order of 10-ft/d. The anisotropy ratio (K_x:K_z) of the Lloyd aquifer is approximately 10:1 (USGS, 1989). Above the Lloyd aquifer is the Magothy Aquifer, confined on the bottom by the Raritan confining unit and, in places, on top by the Monmouth greensand or the Gardiners Clay. The Magothy is an extensive aquifer with horizontal hydraulic conductivities averaging about 50-ft/d and an anisotropy ratio of 100:1. The Jameco Gravel is a relatively thin water- bearing unit stratigraphically above the Magothy that is found only in the far western extent of Long Island. Overlying the Magothy is another extensive aquifer, the UGA (upper glacial aquifer). The UGA serves as the unconfined, water table aquifer from the ground surface to depths up to 700-ft and covers all of Long Island. Horizontal hydraulic conductivities in the UGA average over 200-ft/d with an anisotropy ratio of 10:1. Conductivities of UGA material from the southern half of the island (outwash) are about twice that of northern UGA material (morainal)(Buxton and Modica, 1992).

Water enters the regional groundwater system in recharge areas and moves through it, as driven by the hydraulic gradient and hydraulic conductivity, to discharge areas. The groundwater flow system on Long Island is well understood on a regional basis. The primary recharge areas for the deeper Magothy drinking water supply aquifer is limited to a narrow band located approximately mid-island. The groundwater flow direction is both to the south and north from the recharge area and the ultimate discharge area is the Atlantic Ocean to the south and Long Island Sound to the north.

4.8.2 Study Area Hydrogeology

The hydrogeology of the area surrounding the NCIA site is relatively simple, consisting of

two main water-bearing hydrogeologic units, the UGA and the deeper Magothy Aquifer. The Lloyd Sand Member of the Raritan Formation was not considered in this investigation as it is found at a depth over 600-ft in the study area. The UGA is an unconfined aquifer consisting of poorly sorted sands and gravels which extend from the ground surface to approximately 60 feet. The Magothy is the sole source aquifer for the study area and consists of finer sand, silt and small amounts of clay.
The upper portions of the Magothy Aquifer extends from approximately 60 ft to 450 ft below the ground surface. This portion of the aquifer tends to fine with depth and serves to confine the lower water-bearing portion of the aquifer. The upper portion of the aquifer generally does not yield sufficient quantities of water for municipal use. The lower basal portion of the Magothy aquifer extends from approximately 500 ft to 580 ft. in the study area and consists of varying amounts of sand, gravel, and silt. The upper and lower boundaries of the hydrogeologic units were made based on gross differences in the lithology. For the purposes of this investigation these positions have no time stratigraphic significance. It is quite possible that some deposits of Pleistocene age have been included in the upper part of the Magothy Aquifer.

Following NYSDEC and USEPA regulations, both the UGA and Magothy are protected as sole source aquifers on Long Island. A confining layer between the UGA and the Magothy, the Gardiners clay, is not evident in the study area and the UGA and Magothy are in direct hydraulic connection. Depth to water is about 45 to 55 ft below the ground surface in the study area and the hydraulic gradient is approximately .0006 ft/ft to the southwest.

Based on analysis of in-situ hydraulic tests performed on the four newly installed shallow monitoring wells, hydraulic conductivity values for the UGA in the study area range from 291 to 85 ft/day (slug out). A compilation of the data used in determining these values are contained in Appendix C. During previous investigations at the NCIA forty other in-situ hydraulic test were conducted by LMS. The data from each of these tests indicate that the average value for hydraulic conductivity for the shallow wells (completion depth of 70 or less) averages 162 ft/day. For the intermediate well completed between 70 and 90 feet the average hydraulic conductivity is 71 ft/day, and the deepest wells (90 to 150 ft) exhibit an average hydraulic conductivity of 51 ft/day. The data is in general agreement with reported values for the hydraulic conductivity in the UGA and Magothy. Overall the data suggests a decreasing trend in hydraulic conductivity with depth, but this could not be statistically proven.

The Bowling Green Estates Water District uses two production wells (Well #1 and Well #2) located south of Old Country Road in the Town of Hempstead. Both wells were installed in 1975 and are completed in the basal portion of the Magothy Aquifer. Each have a permitted capacity of 1400 gpm. Well #1 is 532.5 ft deep with a screened zone from 478 to 527.5 ft. Well #2 is 583.5 ft deep with a screened zone from 524 ft to 583.5 ft. Raw water from both wells currently contains VOCs in excess of the NYSDOH drinking water standards. In Well #1 both 1,1,1-TCA and TCE predominate, while in Well #2 TCE predominates. An air stripper and carbon filters currently treat the well water; its average pumping rate is approximately 1200 gpm, with one well pumped at a time.

Under pumping conditions the two supply wells reportedly result in drawdowns of approximately 50 feet in the vicinity of the well. The drawdown from the well extends outward radially from the well creating a cone of depression in the potentiometric surface of the lower water bearing portion of the Magothy Aquifer. The lower values in head within the cone of depression create a significant downward vertical gradient across the confining sands, silts and clays found between the 150 and 450 foot level. This portion of the formation would appear to be the only limiting factor in preventing the migration of the contaminants to the supply wells. Due to it deep depth the data available to describe this portion of the formation is limited. Based on the four borings which have penetrated to the basal section of the formation (the two supply wells and the two deep early warning wells) it appears that some of the clay layers are relatively thick and continuous in the vicinity of the supply wells. It is believed the hydraulic conductivity of the formation between 150 ft and 450 ft is generally low. However, it is not known if zones of higher permeability might serve as downward conduits for the contamination. This is especially true under pumping conditions at the public water supply wells.

CHAPTER 5

NATURE AND EXTENT OF CONTAMINATION

5.1 PREVIOUS INVESTIGATIONS

Previous investigations on the nature and extent of the groundwater contamination associated with the NCIA have been conducted since the 1980's. The data sets which were incorporated into the RI evaluation were compiled from a number of sources including NYSDEC, Nassau County, USGS, and the Town of North Hempstead (Table 5-1). Each data set that was used has documented sampling procedures and analytical protocols and all of the data is usable for the purposes of the RI evaluations.

5.1.1 NCIA Investigation History and Previous Data

The previous analytical results for the area surrounding the NCIA historically dates back to the early 1980's (Table 5-1). The sampling and analysis that was conducted included an initial sampling effort to determine if contamination was present and which areas exhibited impacts. This sampling effort began in 1985 and continued until approximately 1992 (NCDOH 1986). After 1992 the NYSDEC began the State Superfund sponsored PSA sampling and analysis, a majority of this effort was completed by early 1997 (LMS 1996, LMS 1997). The PSA activities resulted in 17 sites listed on the New York State Registry of Inactive Hazardous Waste Sites as Class 2 sites. In order to efficiently investigate this large number of sites the NYSDEC adopted a three-prong approach that included remedial investigations to determine;

1. the nature and extent of any remaining sources of contamination in the soil,
2. the nature and extent of the groundwater contamination attributable to the site within the NCIA (on-site groundwater RI's) and,
3. to determine the nature and extent of the off-site groundwater contamination.

The on-site RI activities were largely completed by 1999 with the completion of the RI investigations at the Frost Street sites (LMS 1999). The investigation to determine the nature and extent of the off-site groundwater contamination began in 1997 (NCIA Off-site Groundwater IIWA) (LMS 1997) and continues as part of this groundwater RI.

TABLE 5-1 (Page 1 of 1)

Groundwater Investigations Incorporated into the Database
As of July 2000
New Cassel Off-Site Groundwater RI/FS Site #1-30-143

Investigation	Date
Town of Hempstead Routine Water Quality Monitoring	1977-present
NCDOH- Investigation of Contaminated Aquifer Segments	1984-1985
Phase I SI Monitoring Well Sampling	1993
Phase I Geoprobe Groundwater Sampling	1993
Phase II SI Geoprobe Groundwater Sampling	1994
NYSDEC Monitoring Well Sampling Round	1995
LMS Monitoring Well Sampling Round	1995
Multi-PSA Geoprobe GW Sampling	1996
Mutli-PSA Task 4	1996
Former Tischon (1-30-043F) RI/FS	1996
IMC Magnetics RI/FS	1997
LAKA Task 10 - Bowling Green Early Warning Wells	1997
Atlas Graphics IIWA	1997
NCIA Off-Site Groundwater IIWA	1997
125 State Street (1-30-043C)	1998
LAKA RI/FS	1998
Arkwin Industries RI/FS	1998
Frost Street Sites RI/FS	1998
"P-Sites" Groundwater Probes	1998
Tischon at Brooklyn Avenue (1-30-043E) RI/FS	1998 , 1999
NCIA Off-Site Groundwater RI/FS - Task 10 - "P-Sites"	1999
29 New York Avenue (1-30-043V) RI/FS	1999
118-130 Swalm Avenue RI/FS	1999
299 Main Street RI/FS	1999
NCIA Off-Site Groundwater RI/FS	1999-present

Each of the individual data sets of groundwater analytical results were incorporated into a Access database and this database was then used to produce a summary of all of the groundwater data for the NCIA area (Appendix F, Table 5-2). This summary table includes all of the historical data and the additional analytical data collected during the RI sampling activities.

5.2 REMEDIAL INVESTIGATION ANALYTICAL RESULTS

5.2.1 Monitoring Well Sampling Results- April 1999

Groundwater samples were collected from 49 monitoring wells in and around the NCIA from 12 April to 21 April 1999. The 49 wells included 41 existing wells, 4 newly installed wells, and the 4 Bowling Green early warning wells (Figure 3-4). Groundwater from each well was collected and analyzed for VOC contamination. Analytical data summary sheets for all monitoring well samples from the April 1999 sampling event can be found in Appendix E.

5.2.1.1 ***VOC Results.*** Summaries of the monitoring well groundwater samples are presented in Table 5-3 and shown on Figure 5-1. Total VOCs in the wells which were sampled ranged from not detected (ND) to 10852 µg/l (N-10470). VOC concentrations exceeded NYSDEC Class GA Standards in 21 of the monitoring well that were sampled. PCE, TCE and their breakdown products were the primary contaminant of concern in 13 of the 21 samples that exceeded the Class GA standards. In 7 of the 21 samples 1,1,1-TCA was the primary contaminant while the remaining sample exhibited similar concentrations of PCE, TCE, and 1,1,1-TCA.

5.2.2 Monitoring Well Sampling Results- August 1999

Groundwater samples were collected from 50 monitoring wells in and around the NCIA during August 1999. The wells included the same subset of wells sampled during the first round of sampling in April 1999 (Figure 3-5). Groundwater from each well was collected and analyzed for VOC contamination. Analytical data summary sheets for all monitoring well samples from the August 1999 sampling event can be found in Appendix

GROUNDWATER DATA SUMMARY
NCIA OFF-SITE PROJECT
Analytical Laboratory
April 1999

SDG Number	127	127A	127C	127A	127C	127	127A	NYSDEC
Lab Sample Number	9910142	9910428	9910968	9910429	9910969	9910364	9910367	CLASS GA
LMS Sample ID	ANSON MW-8	EW-1B	EW-1C	EW-2B	EW-2C	FLMW-204B	FLMW-205B	STANDARDS (b)
Date Collected	4/12/1999	4/16/1999	4/21/1999	4/16/1999	4/21/1999	4/15/1999	4/15/1999	
VOLATILE ORGANICS (µg/l)								
1,1-Dichloroethane	ND	5 j	ND	3 j	ND	1 j	**11**	5
1,1-Dichloroethylene	ND	**27**	ND	**9 j**	ND	1 j	**17**	5
1,1,1-Trichloroethane	ND	**51**	ND	**6 j**	ND	**6 j**	**64**	5
1,2-Dichloroethane	ND	ND	ND	2 j	ND	ND	ND	0.6
1,2-Dichloroethylene(total)	ND	**63**	ND	**65**	ND	**7 j**	**16**	5
2 Butanone	ND	ND	ND	ND	ND	ND	ND	50*
2 Hexanone	ND	ND	ND	ND	ND	**52**	ND	50*
4 Methyl 2 Pentanone	ND	ND	ND	ND	ND	ND	ND	N/A
Acetone	ND	ND	ND	ND	ND	5 j b	ND	50*
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	50*
Chlorobenzene	ND	ND	ND	3 j	ND	ND	ND	5
Chloroethane	ND	ND	ND	ND	ND	ND	ND	5
Chloroform	ND	ND	ND	ND	ND	ND	2 j	7
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	50*
Ethylbenzene	ND	ND	ND	1 j	ND	ND	ND	5
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	5
Tetrachloroethylene	ND	**620**	ND	**31**	ND	ND	**110**	5
Styrene	ND	2 j	ND	2 j	ND	ND	ND	5
Trichloroethylene	ND	**75**	9 j	**220**	ND	**46**	**67**	5
Toluene	ND	3 j	ND	**6 j**	ND	ND	ND	5
Vinyl Chloride	ND	ND	ND	**130**	ND	ND	ND	2
Xylenes (total)	ND	5 j	ND	**6 j**	ND	ND	ND	5
Total VOCs	ND	**851**	9	**484**	ND	**118**	**287**	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/l.
* - Value taken from NYSDEC Class GA Guidance Value.
(b) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
b - Found in associated blanks.
j - Estimated concentration; compound present below quantitation limit.
N/A - Not available.
ND - Not detected at analytical detection limit.
Note: - Numbers in bold exceed standard.

GROUNDWATER DATA SUMMARY
NCIA OFF-SITE PROJECT
Analytical Laboratory
April 1999

SDG Number	**127**	**127**	**127C**	**127**	**127A**	**127**	**127**	**127A**	**NYSDEC**
Lab Sample Number	**9910143**	**9910144**	**9910970**	**9910146**	**9910370**	**9910146**	**9910147**	**9910371**	**CLASS GA**
LMS Sample ID	**N-9938**	**N-9939**	**N-10321**	**N-10322**	**N-10324**	**N-10325**	**N-10326**	**N-10327**	**STANDARDS (b)**
Date Collected	**4/12/1999**	**4/12/1999**	**4/21/1999**	**4/12/1999**	**4/15/1999**	**4/13/1999**	**4/13/1999**	**4/15/1999**	
VOLATILE ORGANICS (μg/l)									
1,1-Dichloroethane	**27**	ND	ND	ND	5 j	ND	3 j	ND	5
1,1-Dichloroethene	**21**	ND	ND	ND	2 j	ND	**7 j**	ND	5
1,1,1-Trichloroethane	**170**	2 j	6 j	5 j	**47**	ND	**42**	ND	5
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	0.6
1,2-Dichloroethene(total)	ND	ND	ND	ND	ND	ND	**110**	ND	5
2 Butanone	ND	ND	ND	ND	ND	ND	ND	ND	50*
2 Hexanone	ND	ND	ND	ND	ND	ND	ND	ND	50*
4 Methyl 2 Pentanone	ND	ND	ND	ND	ND	ND	ND	ND	N/A
Acetone	ND	ND	ND	ND	3 j b	ND	ND	5 j b	50*
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	50*
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	5
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	5
Chloroform	ND	ND	ND	ND	ND	ND	2 j	3 j	7
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	50*
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	5
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND	5
Tetrachloroethene	8 j	1 j	7 j	**12**	**18**	**42**	**89**	ND	5
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	5
Trichloroethene	**12**	ND	ND	ND	**13**	2 j	**11**	ND	5
Toluene	ND	ND	ND	ND	2 j	ND	ND	ND	5
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	2
Xylenes (total)	ND	ND	ND	ND	3 j	ND	ND	ND	5
Total VOCs	**238**	3	13	17	98	44	**264**	8	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/l.
* - Value taken from NYSDEC Class GA Guidance Value.
(b) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
b - Found in associated blanks.
j - Estimated concentration; compound present below quantitation limit.
N/A - Not available.
ND - Not detected at analytical detection limit
Note: - Numbers in bold exceed standard.

GROUNDWATER DATA SUMMARY
NCIA OFF-SITE PROJECT
Analytical Laboratory
April 1999

SDG Number	**127**	**127A**	**127A**	**127C**	**127**	**127**	**127**	**127A**	**NYSDEC**
Lab Sample Number	**9910365**	**9910372**	**9910373**	**9910971**	**9910148**	**9910149**	**9910150**	**9910374**	**CLASS GA**
LMS Sample ID	**N-10328**	**N-10329**	**N-10459**	**N-10462**	**N-10464**	**N-10465**	**N-10470**	**N-10471**	**STANDARDS (b)**
Date Collected	**4/14/1999**	**4/14/1999**	**4/14/1999**	**4/21/1999**	**4/13/1999**	**4/13/1999**	**4/13/1999**	**4/14/1999**	
VOLATILE ORGANICS (µg/l)									
1,1-Dichloroethane	**36**	ND	ND	ND	ND	ND	**460 j d**	ND	5
1,1-Dichloroethene	**63**	ND	ND	ND	ND	ND	**420 j d**	1 j	5
1,1,1-Trichloroethane	**540**	ND	ND	ND	ND	ND	**9600**	**10**	5
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	**3 j**	ND	0.6
1,2-Dichloroethene(total)	ND	ND	ND	ND	ND	ND	**18**	ND	5
2 Butanone	ND	ND	ND	ND	ND	ND	ND	ND	50*
2 Hexanone	ND	ND	ND	ND	ND	ND	ND	ND	50*
4 Methyl 2 Pentanone	ND	ND	ND	ND	ND	ND	ND	ND	N/A
Acetone	3 j b	ND	2 j b	ND	ND	ND	ND	3 j b	50*
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	50*
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	5
Chloroethane	ND	ND	ND	ND	ND	ND	**19**	ND	5
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	7
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	50*
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	5
Methylene Chloride	ND	ND	ND	ND	ND	ND	1 j	ND	5
Tetrachloroethene	ND	ND	ND	**14**	ND	2 j	**51**	1 j	5
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	5
Trichloroethene	4 j	ND	ND	ND	ND	ND	**8 j**	ND	5
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	5
Vinyl Chloride	ND	ND	ND	ND	ND	ND	2 j	ND	2
Xylenes (total)	ND	ND	ND	ND	ND	ND	ND	ND	5
Total VOCs	**646**	ND	2	14	ND	2	**10582**	15	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/l.
* - Value taken from NYSDEC Class GA Guidance Value.
(b) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
b - Found in associated blanks.
j - Estimated concentration; compound present below quantitation limit.
N/A - Not available.
ND - Not detected at analytical detection limit.
Note: - Numbers in bold exceed standard.

GROUNDWATER DATA SUMMARY

NCIA OFF-SITE PROJECT
Analytical Laboratory
April 1999

SDG Number	**127A**	**127A**	**127A**	**127A**	**127**	**127**	**127**	**127A**	**NYSDEC**
Lab Sample Number	**9910375**	**9910376**	**9910377**	**9910378**	**9910151**	**9910152**	**9910153**	**9910379**	**CLASS GA**
LMS Sample ID	**N-10472**	**N-10474**	**N-10475**	**N-10476**	**N-10477**	**N-10478**	**N-10479**	**N-11848**	**STANDARDS (b)**
Date Collected	**4/15/1999**	**4/15/1999**	**4/15/1999**	**4/15/1999**	**4/12/1999**	**4/12/1999**	**4/12/1999**	**4/14/1999**	
VOLATILE ORGANICS (µg/l)									
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	5
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	5
1,1,1-Trichloroethane	ND	**9 j**	ND	ND	2 j	ND	ND	ND	5
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	0.6
1,2-Dichloroethene(total)	ND	ND	ND	1 j	ND	ND	ND	ND	5
2 Butanone	1 j	ND	ND	ND	ND	ND	ND	ND	50*
2 Hexanone	ND	ND	ND	ND	ND	ND	ND	ND	50*
4 Methyl 2 Pentanone	ND	ND	ND	ND	ND	ND	ND	ND	N/A
Acetone	4 j b	ND	6 j b	2 j b	2 j	ND	ND	2 j b	50*
Bromodichloromethane	ND	2 j	ND	ND	ND	ND	ND	ND	50*
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	5
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	5
Chloroform	ND	2 j	ND	ND	ND	ND	ND	ND	7
Dibromochloromethane	ND	2 j	ND	ND	ND	ND	ND	ND	50*
Ethylbenzene	ND	1 j	ND	ND	ND	ND	ND	ND	5
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND	5
Tetrachloroethene	ND	ND	ND	ND	1 j	1 j	ND	ND	5
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	5
Trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	5
Toluene	ND	**7 j**	1 j	ND	ND	ND	ND	ND	5
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	2
Xylenes (total)	ND	**8 j**	ND	ND	ND	ND	ND	ND	5
Total VOCs	5	31	7	3	5	1	ND	2	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/l.
* - Value taken from NYSDEC Class GA Guidance Value.
(b) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
b - Found in associated blanks.
j - Estimated concentration; compound present below quantitation limit.
N/A - Not available.
ND - Not detected at analytical detection limit
Note: - Numbers in bold exceed standard

GROUNDWATER DATA SUMMARY
NCIA OFF-SITE PROJECT
Analytical Laboratory
April 1999

SDG Number	127A	127	127A	127A	127	127	127A	NYSDEC
Lab Sample Number	9910380	9910154	9910381	9910382	9910155	9910156	9910383	CLASS GA
LMS Sample ID	N-11849	N-11850	N-11851	N-11852	N-11854	N-11855	N-11858	STANDARDS (b)
Date Collected	4/14/1999	4/13/1999	4/14/1999	4/14/1999	4/13/1999	4/13/1999	4/14/1999	
VOLATILE ORGANICS (µg/l)								
1,1-Dichloroethane	ND	ND	ND	ND	ND	4	ND	5
1,1-Dichloroethene	ND	ND	ND	ND	ND	**13**	ND	5
1,1,1-Trichloroethane	ND	1 j	ND	ND	ND	**190**	ND	5
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	0.6
1,2-Dichloroethene(total)	ND	ND	ND	ND	ND	ND	ND	5
2 Butanone	ND	ND	ND	ND	ND	ND	ND	50*
2 Hexanone	ND	ND	ND	ND	ND	ND	ND	50*
4 Methyl 2 Pentanone	ND	ND	ND	ND	ND	ND	ND	N/A
Acetone	2 j b	ND	ND	ND	ND	ND	ND	50*
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	50*
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	5
Chloroethane	ND	ND	ND	ND	ND	ND	ND	5
Chloroform	ND	ND	ND	2 j	ND	ND	ND	7
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	50*
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	5
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	5
Tetrachloroethene	ND	**35**	ND	2 j	2 j	ND	ND	5
Styrene	ND	ND	ND	ND	ND	ND	ND	5
Trichloroethene	ND	**12**	2 j	**7 j**	ND	ND	ND	5
Toluene	ND	ND	ND	ND	ND	ND	ND	5
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	2
Xylenes (total)	ND	ND	ND	ND	ND	ND	ND	5
Total VOCs	2	48	2	11	2	**207**	ND	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/l.
* - Value taken from NYSDEC Class GA Guidance Value.
(b) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998
b - Found in associated blanks.
j - Estimated concentration; compound present below quantitation limit.
N/A - Not available.
ND - Not detected at analytical detection limit.
Note: - Numbers in bold exceed standard.

GROUNDWATER DATA SUMMARY

NCIA OFF-SITE PROJECT
Analytical Laboratory
April 1999

SDG Number	**127C**	**127A**	**127A**	**127**	**127A**	**127A**	**NYSDEC**
Lab Sample Number	**9910972**	**9910431**	**9910432**	**9910157**	**9910368**	**9910369**	**CLASS GA**
LMS Sample ID	**N-11859**	**N-11860**	**N-11861**	**N-11862**	**N-72301**	**N-92301**	**STANDARDS (b)**
Date Collected	**4/21/1999**	**4/16/1999**	**4/16/1999**	**4/12/1999**	**4/12/1999**	**4/12/1999**	
VOLATILE ORGANICS (µg/l)							
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	5
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	5
1,1,1-Trichloroethane	ND	2 j	ND	ND	ND	ND	5
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	0.6
1,2-Dichloroethene(total)	ND	ND	ND	ND	ND	ND	5
2 Butanone	ND	ND	ND	ND	ND	ND	50*
2 Hexanone	ND	ND	ND	ND	ND	ND	50*
4 Methyl 2 Pentanone	ND	ND	ND	ND	ND	ND	N/A
Acetone	ND	5 jb	ND	ND	ND	3 j b	50*
Bromodichloromethane	ND	ND	ND	ND	ND	ND	50*
Chlorobenzene	ND	ND	ND	ND	ND	ND	5
Chloroethane	ND	ND	ND	ND	ND	ND	5
Chloroform	ND	5 j	ND	ND	3 j	ND	7
Dibromochloromethane	ND	ND	ND	ND	ND	ND	50*
Ethylbenzene	ND	ND	ND	ND	ND	ND	5
Methylene Chloride	ND	ND	ND	ND	ND	ND	5
• Tetrachloroethene	ND	ND	ND	ND	ND	ND	5
Styrene	ND	ND	ND	ND	ND	ND	5
Trichloroethene	ND	ND	ND	ND	ND	ND	5
Toluene	ND	ND	ND	ND	ND	ND	5
Vinyl Chloride	ND	ND	ND	ND	ND	ND	2
Xylenes (total)	ND	ND	ND	ND	ND	ND	5
Total VOCs	ND	12	ND	ND	3	3	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/l.
* - Value taken from NYSDEC Class GA Guidance Value.
(b) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
b - Found in associated blanks.
j - Estimated concentration; compound present below quantitation limit.
N/A - Not available.
ND - Not detected at analytical detection limit.
Note: - Numbers in bold exceed standard.

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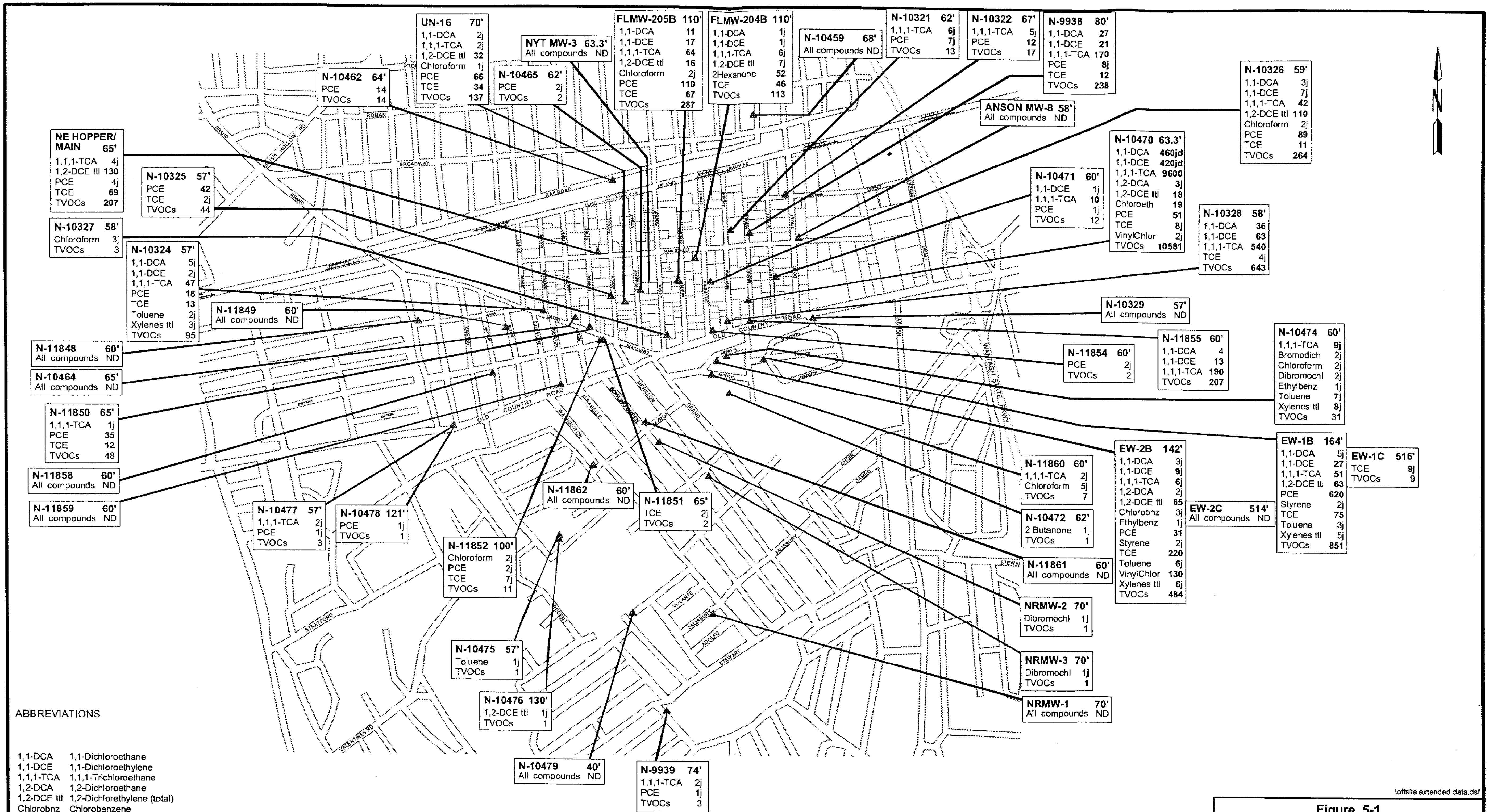
TABLE 5-3 (Page 7 of 7)

GROUNDWATER DATA SUMMARY
NCIA OFF-SITE PROJECT
Analytical Laboratory
April 1999

SDG Number	**127A**	**127C**	**127C**	**127C**	**127**	**127**	**NYSDEC**
Lab Sample Number	**9910433**	**9910973**	**9910974**	**9910975**	**9910158**	**9910159**	**CLASS GA**
LMS Sample ID	**NE HOPPER/MAIN**	**NRMW-1**	**NRMW-2**	**NRMW-3**	**NYT MW-3**	**UN-16**	**STANDARDS (b)**
Date Collected	**4/16/1999**	**2/21/1999**	**4/21/1999**	**4/21/1999**	**4/13/1999**	**4/13/1999**	
VOLATILE ORGANICS (µg/l)							
1,1-Dichloroethane	ND	ND	ND	ND	ND	2 j	5
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	5
1,1,1-Trichloroethane	4 j	ND	ND	ND	ND	2 j	5
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	0.6
1,2-Dichloroethene(total)	**130**	ND	ND	ND	ND	**32**	5
2 Butanone	ND	ND	ND	ND	ND	ND	50*
2 Hexanone	ND	ND	ND	ND	ND	ND	50*
4 Methyl 2 Pentanone	ND	ND	ND	ND	ND	ND	N/A
Acetone	ND	3 j	2 j	ND	ND	ND	50*
Bromodichloromethane	ND	ND	ND	ND	ND	ND	50*
Chlorobenzene	ND	ND	ND	ND	ND	ND	5
Chloroethane	ND	ND	ND	ND	ND	ND	5
Chloroform	ND	ND	ND	ND	ND	1 j	7
Dibromochloromethane	ND	ND	1 j	1 j	ND	ND	50*
Ethylbenzene	ND	ND	ND	ND	ND	ND	5
Methylene Chloride	ND	ND	ND	ND	ND	ND	5
Tetrachloroethene	4 j	ND	ND	ND	ND	**66**	5
Styrene	ND	ND	ND	ND	ND	ND	5
Trichloroethene	**69**	ND	ND	ND	ND	**34**	5
Toluene	ND	ND	ND	ND	ND	ND	5
Vinyl Chloride	ND	ND	ND	ND	ND	ND	2
Xylenes (total)	ND	ND	ND	ND	ND	ND	5
Total VOCs	**207**	3	3	1	ND	137	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/l.
* - Value taken from NYSDEC Class GA Guidance Value.
(b) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
b - Found in associated blanks.
j - Estimated concentration; compound present below quantitation limit.
N/A - Not available.
ND - Not detected at analytical detection limit.
Note: - Numbers in bold exceed standard.



ABBREVIATIONS

1,1-DCA	1,1-Dichloroethane
1,1-DCE	1,1-Dichloroethylene
1,1,1-TCA	1,1,1-Trichloroethane
1,2-DCA	1,2-Dichloroethane
1,2-DCE ttl	1,2-Dichlorethylene (total)
Chlorobnz	Chlorobenzene
Ethylbenz	Ethylbenzene
PCE	Tetrachloroethylene
Dibromochl	Dibromochloromethane
Bromodich	Bromodichloromethane
TCE	Trichloroethylene
VinylChlor	Vinyl Chloride
Xylenes ttl	Xylenes (total)
TVOCs	Total volatile organic compounds
ND	Not detected at analytical detection limit

NOTE TVOC includes only chlorinated solvents

QUALIFIERS

B Value is less than contract required detection limit but greater than instrument detection limit
b Found in associated blanks
d Concentration recovered from diluted sample
j Estimated concentration; compound present below quantitation limit

LEGEND:

Well I.D.
Total depth of well below grade
N-12345 70'
PCE 31
TVOCs 31
Contaminant
Concentration in µg/l

Well Location

0 1200 ft
Approximate Scale
1 in. = 1200 ft

Figure 5-1
April 1999 (Round 1)
Well Sampling
Groundwater Data Summary

OFFSITE INVESTIGATION
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

E.

5.2.2.1 ***VOC Results.*** Summaries of the monitoring well groundwater samples are presented in Table 5-4 and shown on Figure 5-2. Total VOCs in the wells which were sampled ranged from not detected (ND) to 29230 µg/l (N-10470). VOC concentrations exceeded NYSDEC Class GA Standards in 25 of the 50 monitoring well that were sampled. PCE, TCE and their breakdown products were the primary contaminant of concern in 14 of the 25 samples that exceeded the Class GA standards. In 7 of the 25 samples 1,1,1-TCA was the primary contaminant while the remaining 4 samples exhibited similar concentrations of PCE, TCE, and 1,1,1-TCA.

5.2.3 **Monitoring Well Sampling Results- January 2000**

Groundwater samples were collected from 24 monitoring wells in and around the NCIA during January 2000 (Figure 3-6). The 24 wells included a selected subset of the monitoring wells sampled during the first two sampling rounds. Groundwater from each well was collected and analyzed for VOC contamination. Analytical data summary sheets for all monitoring well samples from the August 1999 sampling event can be found in Appendix E.

5.2.3.1 ***VOC Results.*** A summary of the monitoring well groundwater samples is summarized on Table 5-5 and shown on Figure 5-3. The results indicate that 12 of the 24 samples collected exhibit concentrations of VOCs in excess of the Class GA Standard. Total VOCs ranged from ND to 27339 µg/l (N-11855). PCE, TCE and their breakdown products were the primary contaminant of concern in 6 of the 12 samples that exceeded the Class GA standards, in the remaining 6 samples 1,1,1-TCA was the primary contaminant.

5.2.3.2 ***MNA Evaluation Parameters.*** A summary of the monitoring well groundwater samples results for the MNA parameters are summarized on Table 5-5. Methane/ethene was detected in 7 of the 24 groundwater samples that were collected. In a majority of the samples methane/ethene were not detected at the method detection limit. Most of the samples that exhibited methane and ethene had only trace concentrations of these compounds. The highest concentrations were found in NRMW-01 that exhibited a concentration of 6 µg/l of methane and 9 µg/l of ethene. Arsenic was found in 9 of the 24

GROUNDWATER DATA SUMMARY
MONITORING WELL SAMPLING
Round 2 - August 1999

SDG Number Lab Sample Number LMS Sample ID Date Collected	809 B94825 FLMW-204B 8/16/1999	809 B94826 UN-16 8/16/1999	809 B94827 N-11848 8/17/1999	809 B94828 NRMW-4 8/17/1999	809 B94829 N-11862 8/17/1999	809 B94830 DOAK-MW-1 8/17/1999	809 B94831 AIM-33-1 8/17/1999	809 B94832 TB-4 8/18/1999	809 B94833 N-10479 8/18/1999	NYSDEC CLASS GA STANDARDS (b)
Volatile Organic Compounds (ug/L)										
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	2
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	5
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	5
Acetone	ND	ND	ND	ND	ND	ND	ND	ND	ND	50*
1,1-Dichloroethylene	ND	ND	ND	ND	ND	**6 j**	**9 j**	ND	ND	5
1,1-Dichloroethane	ND	1 j	ND	ND	ND	**8 j**	1 j	ND	ND	5
1,2-Dichloroethylene (total)	**7 j**	**32**	ND	ND	ND	3 j	**20**	ND	ND	5
2-Butanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	50*
Chloroform	ND	1 j	ND	ND	ND	ND	1 j	ND	ND	7
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.6
1,1,1-Trichloroethane	3 j	2 j	ND	ND	ND	**43**	**23**	ND	1 j	5
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	5
Trichloroethylene	**42**	**36**	ND	ND	ND	**6 j**	**18**	ND	ND	5
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	1
Tetrachloroethylene	**43**	**96**	ND	ND	ND	**47**	**41**	ND	ND	5
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	5
Xylene (total)	ND	ND	ND	ND	ND	ND	ND	ND	ND	5
Total Organics	95	**168**	ND	ND	ND	**113**	**113**	ND	**1**	100¹

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/L.
* - Value taken from NYSDEC Class GA Guidance Value.
(b) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
d - Concentration recovered from diluted sample.
e - Estimated concentration; exceeds GC/MS calibration range.
j - Estimated concentration; compound present below quantitation limit.
ND - Not detected at analytical detection limit.
Note: - Numbers in bold exceed standard.

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TABLE 5-4 (Page 2 of 7)

GROUNDWATER DATA SUMMARY

MONITORING WELL SAMPLING

Round 2 - August 1999

SDG Number	809	809	809	809	809	809	809	809	809	NYSDEC
Lab Sample Number	B94834	B94835	B94836	B94837	B94838	B94839	B94840	B94841	B94842	CLASS GA
LMS Sample ID	N-10478	N-10477	N-11850	RGMW-1	N-10321	TB-5	N-11852	N-11851	N-10470	STANDARDS (b)
Date Collected	8/18/1999	8/18/1999	8/18/1999	8/18/1999	8/18/1999	8/19/1999	8/19/1999	8/19/1999	8/19/1999	
Volatile Organic Compounds (ug/L)									[DL:500:1]	
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	2
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	**68**	5
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND	3 j	5
Acetone	14	ND	ND	ND	ND	ND	ND	ND	ND	50*
1,1-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	**1400 j d**	5
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	4 j	ND	**1700 j d**	5
1,2-Dichloroethylene (total)	ND	ND	ND	**100**	ND	ND	**17**	ND	**13**	5
2-Butanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	50*
Chloroform	ND	ND	ND	ND	ND	ND	2 j	ND	2 j	7
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	**8 j**	0.6
1,1,1-Trichloroethane	ND	ND	ND	4 j	2 j	ND	3 j	ND	**26000 d**	5
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	5
Trichloroethylene	ND	ND	**8 j**	**73**	ND	ND	**8 j**	3 j	**7 j**	5
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	**2 j**	1
Tetrachloroethylene	ND	2 j	**20**	5 j	3 j	ND	4 j	ND	**27**	5
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	5
Xylene (total)	ND	ND	ND	ND	ND	ND	ND	ND	ND	5
Total Organics •	14	2	28	**182**	5	ND	38	3	**29230**	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/L.

* - Value taken from NYSDEC Class GA Guidance Value.

(b) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

d - Concentration recovered from diluted sample.

e - Estimated concentration; exceeds GC/MS calibration range.

j - Estimated concentration; compound present below quantitation limit.

ND - Not detected at analytical detection limit.

Note: - Numbers in bold exceed standard.

GROUNDWATER DATA SUMMARY
MONITORING WELL SAMPLING
Round 2 - August 1999

SDG Number	809	809	809	809	809	809	809	NYSDEC
Lab Sample Number	B94843	B94844	B94845	B94846	B94847	B94848	B94849	CLASS GA
LMS Sample ID	N-10328	N-10326	ANSON-MW-8	N-10476	N-11849	N-10471D	N-10471S	STANDARDS (b)
Date Collected	8/19/1999	8/19/1999	8/19/1999	8/19/1999	8/19/1999	8/20/1999	8/20/1999	
Volatile Organic Compounds (ug/L	[DL:5:1]	[DL:2.5:1]						
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	2
Chloroethane	ND	ND	ND	ND	ND	ND	ND	5
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	5
Acetone	ND	ND	ND	ND	ND	6 j	ND	50*
1,1-Dichloroethylene	**58**	**9 j**	ND	ND	ND	ND	3 j	5
1,1-Dichloroethane	**28**	3 j	ND	ND	ND	ND	**8 j**	5
1,2-Dichloroethylene (total)	ND	**210 d**	ND	1 j	ND	ND	**17**	5
2-Butanone	10 j	ND	ND	ND	ND	ND	ND	50*
Chloroform	ND	2 j	ND	ND	ND	ND	ND	7
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	0.6
1,1,1-Trichloroethane	**320 d**	**50**	3 j	2 j	2 j	2 j	**23**	5
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	5
Trichloroethylene	2 j	**18**	ND	ND	ND	ND	4 j	5
Benzene	ND	ND	ND	ND	ND	ND	ND	1
Tetrachloroethylene	2 j	**160**	ND	ND	ND	ND	**19**	5
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	5
Xylene (total)	ND	ND	ND	ND	ND	ND	ND	5
Total Organics	**420**	**452**	3	3	2	8	74	100¹

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/L.
* - Value taken from NYSDEC Class GA Guidance Value.
(b) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
d - Concentration recovered from diluted sample.
e - Estimated concentration; exceeds GC/MS calibration range.
j - Estimated concentration; compound present below quantitation limit.
ND - Not detected at analytical detection limit.
Note: - Numbers in bold exceed standard.

TABLE 5-4 (Page 4 of 7)

GROUNDWATER DATA SUMMARY
MONITORING WELL SAMPLING
Round 2 - August 1999

SDG Number	809	809	809	809	809	809	809	809	NYSDEC
Lab Sample Number	B94850	B94851	B94852	B94853	B94854	B94855	B94856	B94857	CLASS GA
LMS Sample ID	N-10327	FLMW-205B	N-10325	N-11855	TB-6	N-11860	N-11858	N-10464	STANDARDS (b)
Date Collected	8/20/1999	8/20/1999	8/20/1999	8/20/1999	8/23/1999	8/23/1999	8/23/1999	8/23/1999	
Volatile Organic Compounds (ug/L)				[DL:10:1]					
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	2
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	5
Methylene Chloride	ND	ND	ND	ND	3 j	ND	ND	ND	5
Acetone	ND	ND	ND	ND	ND	ND	ND	ND	50*
1,1-Dichloroethylene	ND	**14**	ND	**20**	ND	ND	ND	ND	5
1,1-Dichloroethane	ND	**7 j**	ND	5 j	ND	ND	ND	ND	5
1,2-Dichloroethylene (total)	ND	**46**	3 j	ND	ND	ND	ND	ND	5
2-Butanone	ND	ND	4 j	6 j	ND	ND	ND	ND	50*
Chloroform	4 j	2 j	ND	1 j	ND	3 j	ND	ND	7
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	0.6
1,1,1-Trichloroethane	1 j	**32**	ND	**320 d**	ND	1 j	1 j	ND	5
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	5
Trichloroethylene	ND	**100**	5 j	ND	ND	ND	ND	ND	5
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	1
Tetrachloroethylene	2 j	**130**	**33**	2 j	ND	ND	ND	ND	5
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	5
Xylene (total)	ND	ND	ND	3 j	ND	ND	ND	ND	5
Total Organics	7	**331**	45	**357**	3	4	1	ND	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/L.
* - Value taken from NYSDEC Class GA Guidance Value.
(b) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
d - Concentration recovered from diluted sample.
e - Estimated concentration; exceeds GC/MS calibration range.
j - Estimated concentration; compound present below quantitation limit.
ND - Not detected at analytical detection limit.
Note: - Numbers in bold exceed standard.

TABLE 5-4 (Page 5 of 7)

GROUNDWATER DATA SUMMARY
MONITORING WELL SAMPLING
Round 2 - August 1999

SDG Number	809	809	809	809	809	809	809	809	NYSDEC
Lab Sample Number	B94858	B94859	B94860	B94804	B94803	B94802	B94801	B94809	CLASS GA
LMS Sample ID	N-10465	N-10322	UN-23	EW-1B	EW-1C	EW-2B	EW-2C	N-11861	STANDARDS (b)
Date Collected	8/23/1999	8/23/1999	8/24/1999	8/9/1999	8/9/1999	8/9/1999	8/9/1999	8/10/1999	
Volatile Organic Compounds (ug/L)				[DL:5:1]					
Vinyl Chloride	ND	ND	ND	ND	ND	**53**	ND	ND	2
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	5
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND	5
Acetone	ND	ND	ND	ND	ND	10	ND	ND	50*
1,1-Dichloroethylene	ND	ND	ND	**33**	ND	**7 j**	ND	ND	5
1,1-Dichloroethane	ND	ND	ND	5 j	ND	3 j	ND	ND	5
1,2-Dichloroethylene (total)	ND	ND	**7 j**	**68**	ND	**32**	ND	ND	5
2-Butanone	ND	ND	ND	ND	ND	ND	ND	ND	50*
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	7
1,2-Dichloroethane	ND	ND	ND	ND	ND	**1 j**	ND	ND	0.6
1,1,1-Trichloroethane	ND	**6 j**	1 j	**56**	ND	**7 j**	ND	ND	5
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	5
Trichloroethylene	ND	2 j	**11**	**90**	**10**	**130**	ND	ND	5
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	1
Tetrachloroethylene	ND	**19**	**21**	**780 d**	ND	**20**	ND	ND	5
Chlorobenzene	ND	ND	ND	ND	ND	2 j	ND	ND	5
Xylene (total)	ND	ND	ND	ND	ND	ND	ND	ND	5
Total Organics	ND	27	40	**1032**	10	**265**	ND	ND	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/L.
* - Value taken from NYSDEC Class GA Guidance Value.
(b) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
d - Concentration recovered from diluted sample.
e - Estimated concentration; exceeds GC/MS calibration range.
j - Estimated concentration; compound present below quantitation limit.
ND - Not detected at analytical detection limit.
Note: - Numbers in bold exceed standard.

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TABLE 5-4 (Page 6 of 7)

GROUNDWATER DATA SUMMARY
MONITORING WELL SAMPLING
Round 2 - August 1999

SDG Number Lab Sample Number LMS Sample ID Date Collected	809 B94810 N-9937 8/10/1999	809 B94811 N-9938 8/10/1999	809 B94805 N-9939 8/10/1999	809 B94806 NRMW-1 8/10/1999	809 B94808 NRMW-2 8/10/1999	809 B94807 NRMW-3 8/10/1999	809 9923527 TB-1 8/9/1999	NYSDEC CLASS GA STANDARDS (b)
Volatile Organic Compounds (ug/L)	[DL:2.5:1]	[DL:2:1]						
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	2
Chloroethane	ND	2 j	ND	ND	ND	ND	ND	5
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	5
Acetone	ND	ND	ND	ND	ND	ND	ND	50*
1,1-Dichloroethylene	**39**	**44**	ND	ND	ND	ND	ND	5
1,1-Dichloroethane	**48**	**51**	ND	ND	ND	ND	ND	5
1,2-Dichloroethylene (total)	2 j	2 j	ND	ND	ND	ND	ND	5
2-Butanone	ND	ND	ND	ND	ND	ND	ND	50*
Chloroform	ND	ND	ND	1 j	ND	ND	ND	7
1,2-Dichloroethane	**2 j**	**2 j**	ND	ND	ND	ND	ND	0.6
1,1,1-Trichloroethane	**320 d**	**280 d**	2 j	ND	ND	ND	ND	5
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	5
Trichloroethylene	**29**	**31**	ND	ND	ND	ND	ND	5
Benzene	ND	ND	ND	ND	ND	ND	ND	1
Tetrachloroethylene	**14**	**15**	ND	ND	ND	ND	ND	5
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	5
Xylene (total)	ND	ND	ND	ND	ND	ND	ND	5
Total Organics	**454**	**427**	2	1	ND	ND	ND	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/L.
* - Value taken from NYSDEC Class GA Guidance Value.
(b) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
d - Concentration recovered from diluted sample.
e - Estimated concentration; exceeds GC/MS calibration range.
j - Estimated concentration; compound present below quantitation limit.
ND - Not detected at analytical detection limit.
Note: - Numbers in bold exceed standard.

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TABLE 5-4 (Page 7 of 7)

GROUNDWATER DATA SUMMARY
MONITORING WELL SAMPLING
Round 2 - August 1999

SDG Number *	809	809	809	809	809	809	809	809	809	809	NYSDEC
Lab Sample Number	9923882	B94814	B94815	B94816	B94817	B94818	B94819	B94820	B94821	B94822	CLASS GA
LMS Sample ID	TB-2	N-10459	N-10329	N-10462	N-10323	N-10324	N-10472	TB-3	N-10474	N-11859	STANDARDS (b)
Date Collected	8/12/1999	8/12/1999	8/12/1999	8/12/1999	8/12/1999	8/13/1999	8/13/1999	8/16/1999	8/16/1999	8/16/1999	
Volatile Organic Compounds (ug/L)											
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5
Acetone	2 j	ND	ND	ND	ND	ND	ND	ND	ND	ND	50*
1,1-Dichloroethylene	ND	ND	ND	ND	2 j	2 j	ND	ND	**20**	ND	5
1,1-Dichloroethane	ND	ND	ND	ND	3 j	3 j	ND	ND	**7 j**	ND	5
1,2-Dichloroethylene (total)	ND	ND	ND	ND	ND	ND	ND	ND	2 j	ND	5
2-Butanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	50*
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	1 j	ND	7
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.6
1,1,1-Trichloroethane	ND	ND	ND	ND	**45**	**42**	ND	ND	**97**	ND	5
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5
Trichloroethylene	ND	ND	ND	ND	**22**	**21**	ND	ND	**20**	ND	5
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1
Tetrachloroethylene	ND	ND	ND	**8 j**	**26**	**24**	ND	ND	**11**	ND	5
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5
Xylene (total)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5
Total Organics	2	ND	ND	8	98	92	ND	ND	**158**	ND	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/L.
* - Value taken from NYSDEC Class GA Guidance Value.
(b) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
d - Concentration recovered from diluted sample.
e - Estimated concentration; exceeds GC/MS calibration range.
j - Estimated concentration; compound present below quantitation limit.
ND - Not detected at analytical detection limit.
Note: - Numbers in bold exceed standard.

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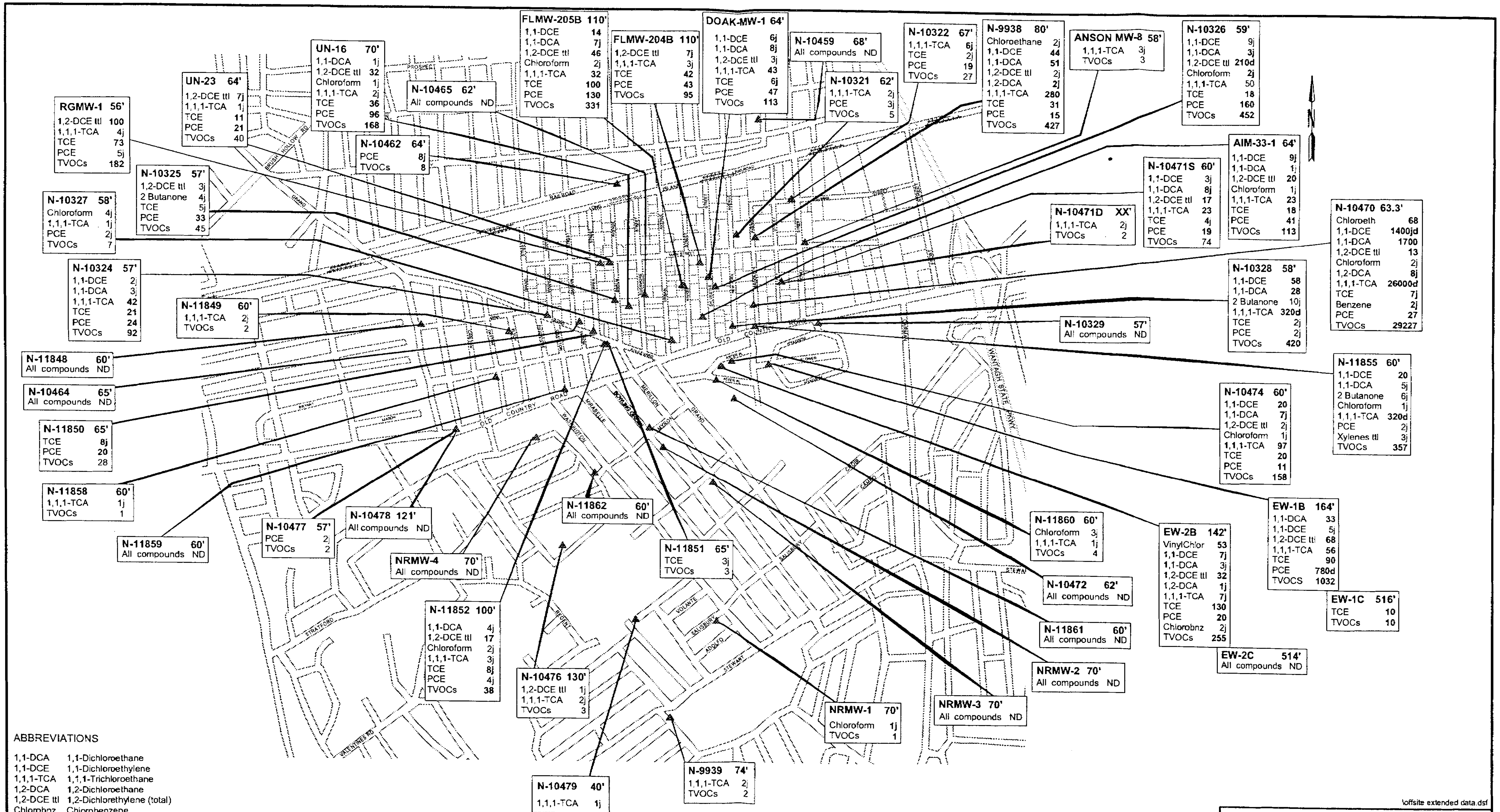

ABBREVIATIONS

1,1-DCA	1,1-Dichloroethane
1,1-DCE	1,1-Dichloroethylene
1,1,1-TCA	1,1,1-Trichloroethane
1,2-DCA	1,2-Dichloroethane
1,2-DCE ttl	1,2-Dichlorethylene (total)
Chlorobnz	Chlorobenzene
Ethylbenz	Ethylbenzene
PCE	Tetrachloroethylene
Dibromochl	Dibromochloromethane
Bromodich	Bromodichloromethane
TCE	Trichloroethylene
VinylChlor	Vinyl Chloride
Xylenes ttl	Xylenes (total)
TVOCs	Total volatile organic compounds
ND	Not detected at analytical detection limit

NOTE TVOC includes only chlorinated solvents

QUALIFIERS

- B Value is less than contract required detection limit but greater than instrument detection limit
- b Found in associated blanks
- d Concentration recovered from diluted sample
- j Estimated concentration; compound present below quantitation limit

LEGEND:

Well I.D. — N-12345 70' — Total depth of well below grade

PCE 31

TVOCs 31

Contaminant — Concentration in µg/l

Well Location ▲

0 — 1200 ft

Approximate Scale

1 in. = 1200 ft

\offsite extended data.dsf

Figure 5-2

August 1999 (Round 2)
Well Sampling
Groundwater Data Summary

OFFSITE INVESTIGATION
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

TABLE 5-5 (Page 1 of 4)

GROUNDWATER DATA SUMMARY
MONITORING WELL SAMPLING
Round 3 - January 2000

SDG Number	**110**	**110**	**110**	**110**	**110**	**110**	**NYSDEC**
Lab Sample Number	**B94801**	**B94802**	**B94803**	**B94804**	**B94805**	**B94806**	**CLASS GA**
LMS Sample ID	**EW-1C**	**EW-2C**	**BD of EW-2C**	**NRMW-1**	**NRMW-2**	**NRMW-3**	**STANDARDS (b)**
Date Collected	**1/10/2000**	**1/10/2000**	**1/10/2000**	**1/11/2000**	**1/11/2000**	**1/11/2000**	
VOLATILE ORGANICS (µg/l)							
Methane	ND	ND	ND	6	ND	ND	N/A
Ethene	ND	ND	ND	9	ND	ND	N/A
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	5
1,1-Dichloroethylene	ND	ND	ND	ND	ND	ND	5
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	5
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	0.6
1,2-Dichloroethylene(total)	ND	ND	ND	ND	ND	ND	5
Chloroform	ND	ND	ND	ND	ND	ND	7
Methylene Chloride	ND	ND	ND	ND	ND	ND	5
Tetrachloroethylene	ND	ND	ND	ND	ND	ND	5
Trichloroethylene	**10**	ND	ND	ND	ND	ND	5
Toluene	ND	ND	ND	ND	ND	ND	5
Vinyl Chloride	ND	ND	ND	ND	ND	ND	2
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	3
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	3
Xylenes (total)	ND	ND	ND	2 j b	ND	ND	5
Total VOCs	10	ND	ND	17	ND	ND	100[1]
Metals (ug/l)							
Arsenic	ND	ND	ND	ND	ND	ND	25
Iron	**427**	**379**	**380**	227	67.1 B	124	300
Manganese	34.2	26.3	29.3	**579**	236	5.3 B	300

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/l.
• - Value taken from NYSDEC Class GA Guidance Value.
(b) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
b - Found in associated blanks.
j - Estimated concentration; compound present below quantitation limit.
B - Value is less than the contract-required detection limit but greater than the instrument detection limit.
N/A - Not available.
ND - Not detected at analytical detection limit.
Note: - Numbers in bold exceed standard.

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TABLE 5-5 (Page 2 of 4)

GROUNDWATER DATA SUMMARY
MONITORING WELL SAMPLING
Round 3 - January 2000

SDG Number	110	110	110	110	110	110	110	110	NYSDEC
Lab Sample Number	B94807	B94808	B94809	B94810	B94811	B94812	B94813	B94814	CLASS GA
LMS Sample ID	NRMW-4	TB-1	TB-2	FSMW-7A	FSMW-7B	N-10477	N-10478	FSMW-6A	STANDARDS (b)
Date Collected	1/11/2000	1/10/2000	1/12/2000	1/12/2000	1/12/2000	1/12/2000	1/12/2000	1/13/2000	
VOLATILE ORGANICS (μg/l)									
Methane	ND	ND	ND	ND	ND	ND	ND	0.9 j	N/A
Ethene	ND	ND	ND	ND	ND	ND	ND	ND	N/A
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	5
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	5
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	5
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	0.6
1,2-Dichloroethene(total)	ND	ND	ND	ND	ND	ND	ND	ND	5
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	7
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND	5
Tetrachloroethene	ND	ND	ND	ND	ND	ND	1 j	ND	5
Trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	5
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	5
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	2
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	3
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	3
Xylenes (total)	ND	ND	ND	ND	ND	ND	ND	ND	5
Total VOCs	ND	ND	ND	ND	ND	ND	1	0.9	100[1]
Metals (ug/l)									
Arsenic	ND	N/A	N/A	ND	ND	3.4 B	ND	ND	25
Iron	101	N/A	N/A	**470**	**449**	**1500**	**495**	262	300
Manganese	123	N/A	N/A	20.5	24.4	**301**	38.6	10.8 B	300

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/l.
* - Value taken from NYSDEC Class GA Guidance Value.
(b) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
b - Found in associated blanks.
j - Estimated concentration; compound present below quantitation limit.
B - Value is less than the contract-required detection limit but greater than the instrument detection limit.
N/A - Not available.
ND - Not detected at analytical detection limit.
Note: - Numbers in bold exceed standard.

GROUNDWATER DATA SUMMARY

MONITORING WELL SAMPLING

Round 3 - January 2000

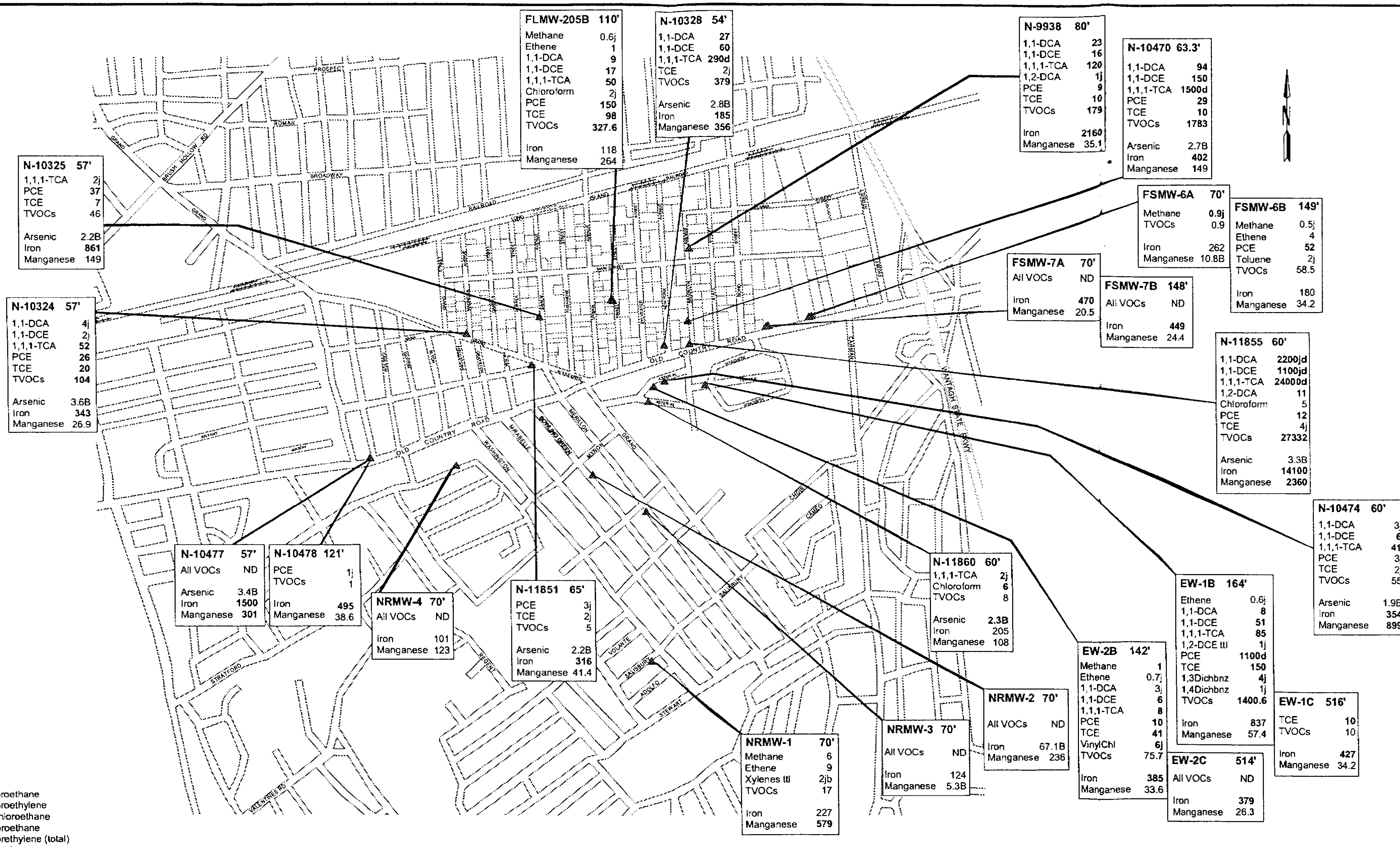
SDG Number	**110**	**110**	**110**	**110**	**110**	**110**	**110**	**110**	**NYSDEC**
Lab Sample Number	**B94815**	**B94816**	**B94817**	**B94818**	**B94819**	**B94820**	**B94821**	**B94823**	**CLASS GA**
LMS Sample ID	**FSMW-6B**	**EW-1B**	**EW-2B**	**N-10474**	**TB-3**	**N-11851**	**N-9938**	**FLMW-205B**	**STANDARDS (b)**
Date Collected	**1/13/2000**	**1/13/2000**	**1/13/2000**	**1/13/2000**	**1/13/2000**	**1/14/2000**	**1/14/2000**	**1/17/2000**	
VOLATILE ORGANICS (µg/l)		[DL:20:1]							
Methane	0.5 j	ND	1	ND	ND	ND	ND	0.6 j	N/A
Ethene	4	0.6 j	0.7 j	ND	ND	ND	ND	1	N/A
1,1-Dichloroethane	ND	**8**	3 j	3 j	ND	ND	**23**	**9**	5
1,1-Dichloroethene	ND	**51**	**6**	**6**	ND	ND	**16**	**17**	5
1,1,1-Trichloroethane	ND	**85**	**8**	**41**	ND	ND	**120**	**50**	5
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	**1 j**	ND	0.6
1,2-Dichloroethene(total)	ND	1 j	ND	ND	ND	ND	ND	ND	5
Chloroform	ND	ND	ND	ND	ND	ND	ND	2 j	7
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND	5
Tetrachloroethene	**52**	**1100 d**	**10**	3 j	ND	3 j	**9**	**150**	5
Trichloroethene	ND	**150**	**41**	2 j	ND	2 j	**10**	**98**	5
Toluene	2 j	ND	ND	ND	ND	ND	ND	ND	5
Vinyl Chloride	ND	ND	**6 j**	ND	ND	ND	ND	ND	2
1,3-Dichlorobenzene	ND	**4 j**	ND	ND	ND	ND	ND	ND	3
1,4-Dichlorobenzene	ND	1 j	ND	ND	ND	ND	ND	ND	3
Xylenes (total)	ND	ND	ND	ND	ND	ND	ND	ND	5
Total VOCs	58.5	1400.6	75.7	55	ND	5	179	327.6	100[1]
Metals (ug/l)									
Arsenic	ND	ND	ND	1.9 B	N/A	2.2 B	ND	ND	25
Iron	180	**837**	**385**	**354**	N/A	**316**	**2160**	118	300
Manganese	34.2	57.4	33.6	**899**	N/A	41.4	35.1	264	300

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/l.
• - Value taken from NYSDEC Class GA Guidance Value.
(b) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
b - Found in associated blanks.
j - Estimated concentration; compound present below quantitation limit.
B - Value is less than the contract-required detection limit but greater than the instrument detection limit.
N/A - Not available.
ND - Not detected at analytical detection limit.
Note: - Numbers in bold exceed standard.

GROUNDWATER DATA SUMMARY
MONITORING WELL SAMPLING
Round 3 - January 2000

SDG Number	110	110	110	110	110	110	NYSDEC
Lab Sample Number	B94824	B94825	B94826	B94827	B94828	B94829	CLASS GA
LMS Sample ID	N-11855	N-10328	N-10324	N-10470	N-10325	N-11860	STANDARDS (b)
Date Collected	1/18/2000	1/18/2000	1/18/2000	1/17/2000	1/18/2000	1/17/2000	
VOLATILE ORGANICS (µg/l)	[DL:500:1]	[DL:5:1]		[DL:20:1]			
Methane	ND	ND	ND	ND	ND	ND	N/A
Ethene	ND	ND	ND	ND	ND	ND	N/A
1,1-Dichloroethane	**2200 j d**	**27**	4 j	**94**	ND	ND	5
1,1-Dichloroethene	**1100 j d**	**60**	2 j	**150**	ND	ND	5
1,1,1-Trichloroethane	**24000 d**	**290 d**	**52**	**1500 d**	2 j	2 j	5
1,2-Dichloroethane	**11**	ND	ND	ND	ND	ND	0.6
1,2-Dichloroethene(total)	ND	ND	ND	ND	ND	ND	5
Chloroform	5	ND	ND	ND	ND	6	7
Methylene Chloride	**7**	ND	ND	ND	ND	ND	5
Tetrachloroethene	**12**	ND	**26**	**29**	**37**	ND	5
Trichloroethene	4 j	2 j	**20**	**10**	**7**	ND	5
Toluene	ND	ND	ND	ND	ND	ND	5
Vinyl Chloride	ND	ND	ND	ND	ND	ND	2
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	3
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	3
Xylenes (total)	ND	ND	ND	ND	ND	ND	5
Total VOCs	27339	379	104	1783	46	8	100[1]
Metals (ug/l)							
Arsenic	3.3 B	2.8 B	3.6 B	2.7 B	2.2 B	2.3 B	25
Iron	**14100**	**185**	**343**	**402**	**861**	205	300
Manganese	**2360**	**356**	26.9	149	149	108	300

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/l.
* - Value taken from NYSDEC Class GA Guidance Value.
(b) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
b - Found in associated blanks.
j - Estimated concentration; compound present below quantitation limit.
B - Value is less than the contract-required detection limit but greater than the instrument detection limit.
N/A - Not available.
ND - Not detected at analytical detection limit.
Note: - Numbers in bold exceed standard.



ABBREVIATIONS

1,1-DCA	1,1-Dichloroethane
1,1-DCE	1,1-Dichloroethylene
1,1,1-TCA	1,1,1-Trichloroethane
1,2-DCA	1,2-Dichloroethane
1,2-DCE ttl	1,2-Dichlorethylene (total)
1,3Dichbnz	1,3-Dichlorobenzene
1,4Dichbnz	1,4-Dichlorobenzene
Chlorobnz	Chlorobenzene
Ethylbenz	Ethylbenzene
PCE	Tetrachloroethylene
Dibromochl	Dibromochloromethane
Bromodich	Bromodichloromethane
TCE	Trichloroethylene
VinylChlor	Vinyl Chloride
Xylenes ttl	Xylenes (total)
TVOCs	Total volatile organic compounds
ND	Not detected at analytical detection limit

NOTE TVOC includes only chlorinated solvents

QUALIFIERS

B	Value is less than contract required detection limit but greater than instrument detection limit
b	Found in associated blanks
d	Concentration recovered from diluted sample
j	Estimated concentration; compound present below quantitation limit

LEGEND:

Well I.D.
Total depth of well below grade
N-12345 70'
PCE 31
TVOCs 31
Contaminant
Concentration in µg/l
Well Location ▲

0 1200 ft
Approximate Scale
1 in. = 1200 ft

Figure 5-3

January 2000 (Round 3) Well Sampling Groundwater Data Summary

OFFSITE INVESTIGATION
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

R2-0000412

groundwater samples that were collected. The arsenic concentrations ranged from ND to 3.6 μg/l (N-10324). Iron was found in all of the samples that were collected and the concentrations ranged from 67.1 μg/l (NRMW-02) to 14100 μg/l (N-11855). Manganese was found in all of the samples that were collected and the concentrations ranged from 5.3 μg/l (NRMW-03) to 2360 μg/l (N-11855). Many of the samples exceeded the Class GA groundwater standards for iron and manganese. However it is believed the noted concentrations are the result of natural geochemical reactions in the aquifer and are not indicative of past disposal practices.

5.2.4 **Hydropunch Groundwater Sampling Results- January and February 2000**

Groundwater samples were collected at a 10-ft. sampling interval from 4 hydropunch groundwater sampling locations during January and February 2000. Each of the groundwater samples collected during this sampling effort were analyzed for VOC contamination. Analytical data summary sheets for these samples are also found in Appendix E.

5.2.4.1 ***VOC Results.*** A summary of the analytical results from the hydropunch groundwater samples is found on Table 5-6 and shown on Figure 5-4. The analytical results for GWHP-01 indicate that 7 of the 10 samples that were collected exhibit VOC concentration in excess of the Class GA groundwater standards. Total VOC concentrations at this location ranged from ND (70 to 72 ft. sample) to 5497 μg/l (138 to 140 ft. sample). TCE, PCE and their breakdown products were the primary contaminants detected, significant concentrations of 1,1,1-TCA and it's breakdown products were also found (Figure 5-4). In general total VOC concentrations increased with depth between 90 and 140 feet below the ground surface.

The analytical results for GWHP-02 indicate that only two of the samples that were collected exhibited VOC concentration in excess of the Class GA groundwater standards. The two samples which exceeded the Class GA standards were the 100 to 102 ft sample and the deepest sample collected at 148 to 150 ft. (Figure 5-4). Total VOCs in the 100 to 102 ft sample were 8 μg/l and 31 μg/l in the 148 to 150 ft. sample. 1,1,1-TCA was the predominant compound in both samples.

The analytical results for GWHP-03 indicate that 8 of the 9 samples that were collected

TABLE 5-6 (Page 1 of 12)

GROUNDWATER DATA SUMMARY
HYDROPUNCH SAMPLING
January February 2000

SDG Number	**120**	**120**	**120**	**120**	**NYSDEC**
Lab Sample Number	**B94839**	**B94840**	**B94841**	**B94842**	**CLASS GA**
LMS Sample ID	**GWHP-1 (TB-6)**	**GWHP-1 (128-130)**	**GWHP-1 (138-140)**	**GWHP-1 (148-150)**	**STANDARDS (b)**
Date Collected	**1/24/2000**	**1/24/2000**	**1/24/2000**	**1/24/2000**	
VOLATILE ORGANICS (µg/l)		[DL:25:1]	[DL:25:1]		
1,1-Dichloroethane	ND	**750 d**	**880 d**	ND	5
1,1-Dichloroethene	ND	**1600 d**	**1700 d**	4 j	5
1,1,1-Trichloroethane	ND	**790 d**	**820 d**	4 j	5
1,1,2-Trichloroethane	ND	**6 j**	**8 j**	ND	1
1,2-Dichloroethane	ND	**16**	**22**	ND	0.6
1,2-Dichloroethene(total)	ND	**94**	**77**	ND	5
Acetone	ND	ND	ND	ND	50*
Carbon Disulfide	ND	ND	ND	ND	N/A
Chloroethane	ND	ND	ND	ND	5
Chloroform	ND	**8 j**	**8 j**	ND	7
Methylene Chloride	ND	**11**	**17**	ND	5
Tetrachloroethene	ND	**180**	**160 j d**	ND	5
Trichloroethene	ND	**1800 d**	**1800 d**	**6 j**	5
Vinyl Chloride	ND	**6 j**	**5 j**	ND	2
Xylenes (total)	ND	ND	ND	ND	5
Total VOCs	ND	**5261**	**5497**	12	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/l.
* - Value taken from NYSDEC Class GA Guidance Value.
(b) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
j - Estimated concentration; compound present below quantitation limit.
N/A - Not available.
ND - Not detected at analytical detection limit.
Note: - Numbers in bold exceed standard.

TABLE 5-6 (Page 2 of 12)

GROUNDWATER DATA SUMMARY
HYDROPUNCH SAMPLING
January February 2000

SDG Number	120	120	120	120	NYSDEC
Lab Sample Number	B94834	B94836	B94838	B94837	CLASS GA
LMS Sample ID	GWHP-1 (BD of 90-92)	GWHP-1 (98-100)	GWHP-1 (108-110)	GWHP-1 (118-120)	STANDARDS (b)
Date Collected	1/20/2000	1/21/2000	1/21/2000	1/21/2000	
VOLATILE ORGANICS (µg/l)		[DL:2.5:1]	[DL:5:1]	[DL:5:1]	
1,1-Dichloroethane	**13**	**110**	**200**	**190 d**	5
1,1-Dichloroethene	**25**	**260 d**	**360 d**	**460 d**	5
1,1,1-Trichloroethane	**21**	**180 d**	**270 d**	**260 d**	5
1,1,2-Trichloroethane	ND	1 j	**2 j**	**2 j**	1
1,2-Dichloroethane	ND	ND	ND	**4 j**	0.6
1,2-Dichloroethene(total)	2 j	**29**	**46**	**65**	5
Acetone	ND	ND	ND	ND	50*
Carbon Disulfide	ND	ND	ND	ND	N/A
Chloroethane	ND	2 j	ND	ND	5
Chloroform	ND	3 j	5 j	6 j	7
Methylene Chloride	ND	1 j	3 j	3 j	5
Tetrachloroethene	**6 j**	**51**	**76**	**86**	5
Trichloroethene	**19**	**220 d**	**300 d**	**420 d**	5
Vinyl Chloride	ND	ND	ND	ND	2
Xylenes (total)	ND	ND	ND	2 j	5
Total VOCs	86	**857**	**1262**	**1498**	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/l.
* - Value taken from NYSDEC Class GA Guidance Value.
(b) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
j - Estimated concentration; compound present below quantitation limit.
N/A - Not available.
ND - Not detected at analytical detection limit.
Note: - Numbers in bold exceed standard.

TABLE 5-6 (Page 3 of 12)

GROUNDWATER DATA SUMMARY
HYDROPUNCH SAMPLING
January February 2000

SDG Number	**120**	**120**	**120**	**120**	**120**	**NYSDEC**
Lab Sample Number	**B94831**	**B94830**	**B94832**	**B94833**	**B94835**	**CLASS GA**
LMS Sample ID	**GWHP-1 (TB-5)**	**GWHP-1 (60-62)**	**GWHP-1 (70-72)**	**GWHP-1 (80-82)**	**GWHP-1 (90-92)**	**STANDARDS (b)**
Date Collected	**1/20/2000**	**1/20/2000**	**1/20/2000**	**1/20/2000**	**1/21/2000**	
VOLATILE ORGANICS (µg/l)						
1,1-Dichloroethane	ND	ND	ND	ND	**12**	5
1,1-Dichloroethylene	ND	ND	ND	ND	**24**	5
1,1,1-Trichloroethane	ND	ND	ND	ND	**21**	5
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	1
1,2-Dichloroethane	ND	ND	ND	ND	ND	0.6
1,2-Dichloroethylene(total)	ND	ND	ND	ND	ND	5
Acetone	ND	3 j	ND	ND	ND	50*
Carbon Disulfide	ND	ND	ND	ND	ND	N/A
Chloroethane	ND	ND	ND	ND	ND	5
Chloroform	ND	2 j	ND	2 j	ND	7
Methylene Chloride	ND	ND	ND	ND	ND	5
Tetrachloroethylene	ND	ND	ND	ND	5 j	5
Trichloroethylene	ND	ND	ND	ND	**17**	5
Vinyl Chloride	ND	ND	ND	ND	ND	2
Xylenes (total)	ND	ND	ND	ND	ND	5
Total VOCs	ND	5	ND	2	79	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/l.
* - Value taken from NYSDEC Class GA Guidance Value.
(b) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
j - Estimated concentration; compound present below quantitation limit.
N/A - Not available.
ND - Not detected at analytical detection limit.
Note: - Numbers in bold exceed standard.

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GROUNDWATER DATA SUMMARY
HYDROPUNCH SAMPLING
January February 2000

SDG Number	128	128	128	128	128	NYSDEC
Lab Sample Number	**B94843**	**B94844**	**B94845**	**B94846**	**B94847**	**CLASS GA**
LMS Sample ID	**TB-7**	**GWHP-2 (58-60)**	**GWHP-2 (70-72)**	**GWHP-2 (78-80)**	**GWHP-2 (94-96)**	**STANDARDS (b)**
Date Collected	**1/28/2000**	**1/28/2000**	**1/28/2000**	**1/28/2000**	**1/31/2000**	
VOLATILE ORGANICS (µg/l)						
1,1-Dichloroethane	ND	ND	ND	ND	ND	5
1,1-Dichloroethylene	ND	ND	ND	ND	ND	5
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	5
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	1
1,2-Dichloroethane	ND	ND	ND	ND	ND	0.6
1,2-Dichloroethylene(total)	ND	ND	ND	ND	ND	5
Acetone	ND	ND	ND	ND	ND	50*
Carbon Disulfide	ND	ND	ND	ND	2 j	N/A
Chloroethane	ND	ND	ND	ND	ND	5
Chloroform	ND	ND	ND	ND	ND	7
Methylene Chloride	ND	ND	ND	ND	ND	5
Tetrachloroethylene	ND	ND	ND	ND	ND	5
Trichloroethylene	ND	ND	ND	ND	ND	5
Vinyl Chloride	ND	ND	ND	ND	ND	2
Xylenes (total)	ND	ND	ND	ND	ND	5
Total VOCs	ND	ND	ND	ND	2	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/l.
* - Value taken from NYSDEC Class GA Guidance Value.
(b) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
j - Estimated concentration; compound present below quantitation limit.
N/A - Not available.
ND - Not detected at analytical detection limit.
Note: - Numbers in bold exceed standard.

GROUNDWATER DATA SUMMARY
HYDROPUNCH SAMPLING
January February 2000

SDG Number	**128**	**128**	**128**	**128**	**NYSDEC**
Lab Sample Number	**B94848**	**B94849**	**B94850**	**B94851**	**CLASS GA**
LMS Sample ID	**GWHP-2 (100-102)**	**GWHP-2 (108-110)**	**GWHP-2 (118-120)**	**GWHP-2 (128-130)**	**STANDARDS (b)**
Date Collected	**1/31/2000**	**1/31/2000**	**1/31/2000**	**1/31/2000**	
VOLATILE ORGANICS (µg/l)					
1,1-Dichloroethane	ND	ND	ND	ND	5
1,1-Dichloroethene	ND	ND	ND	ND	5
1,1,1-Trichloroethane	**8 j**	3 j	2 j	2 j	5
1,1,2-Trichloroethane	ND	ND	ND	ND	1
1,2-Dichloroethane	ND	ND	ND	ND	0.6
1,2-Dichloroethene(total)	ND	ND	ND	ND	5
Acetone	ND	ND	ND	ND	50*
Carbon Disulfide	ND	ND	ND	ND	N/A
Chloroethane	ND	ND	ND	ND	5
Chloroform	ND	ND	ND	ND	7
Methylene Chloride	ND	ND	ND	ND	5
Tetrachloroethene	ND	ND	ND	ND	5
Trichloroethene	ND	ND	ND	ND	5
Vinyl Chloride	ND	ND	ND	ND	2
Xylenes (total)	ND	3 j	3 j	3 j	5
Total VOCs	8	6	5	5	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/l.
* - Value taken from NYSDEC Class GA Guidance Value.
(b) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
j - Estimated concentration; compound present below quantitation limit.
N/A - Not available.
ND - Not detected at analytical detection limit.
Note: - Numbers in bold exceed standard.

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GROUNDWATER DATA SUMMARY
HYDROPUNCH SAMPLING
January February 2000

SDG Number	**128**	**128**	**128**	**128**	**NYSDEC**
Lab Sample Number	**B94852**	**B94853**	**B94854**	**B94855**	**CLASS GA**
LMS Sample ID	**GWHP-2 (138-140)**	**GWHP-2 (148-150)**	**TB-8**	**GWHP-3 (58-60)**	**STANDARDS (b)**
Date Collected	**2/1/2000**	**2/1/2000**	**2/3/2000**	**2/3/2000**	
VOLATILE ORGANICS (µg/l)					
1,1-Dichloroethane	ND	2 j	ND	**6 j**	5
1,1-Dichloroethene	ND	4 j	ND	ND	5
1,1,1-Trichloroethane	ND	**8 j**	ND	ND	5
1,1,2-Trichloroethane	ND	ND	ND	ND	1
1,2-Dichloroethane	ND	ND	ND	ND	0.6
1,2-Dichloroethene(total)	ND	2 j	ND	ND	5
Acetone	ND	ND	ND	ND	50*
Carbon Disulfide	ND	ND	ND	ND	N/A
Chloroethane	ND	ND	ND	ND	5
Chloroform	ND	ND	ND	ND	7
Methylene Chloride	ND	ND	ND	ND	5
Tetrachloroethene	ND	5 j	ND	ND	5
Trichloroethene	ND	**10**	ND	ND	5
Vinyl Chloride	ND	ND	ND	ND	2
Xylenes (total)	ND	ND	ND	ND	5
Total VOCs	ND	31	ND	6	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/l.
* - Value taken from NYSDEC Class GA Guidance Value.
(b) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
j - Estimated concentration; compound present below quantitation limit.
N/A - Not available.
ND - Not detected at analytical detection limit.
Note: - Numbers in bold exceed standard.

GROUNDWATER DATA SUMMARY
HYDROPUNCH SAMPLING
January February 2000

SDG Number	**128**	**128**	**128**	**128**	**NYSDEC**
Lab Sample Number	**B94856**	**B94857**	**B94858**	**B94859**	**CLASS GA**
LMS Sample ID	**GWHP-3 (68-70)**	**GWHP-3 (78-80)**	**GWHP-3 (BD of 68-70)**	**GWHP-3 (88-90)**	**STANDARDS (b)**
Date Collected	**2/3/2000**	**2/3/2000**	**2/3/2000**	**2/4/2000**	
VOLATILE ORGANICS (µg/l)		[DL:2.5:1]		[DL:2.5:1]	
1,1-Dichloroethane	2 j	**46**	2 j	**36**	5
1,1-Dichloroethene	2 j	**24**	2 j	**26**	5
1,1,1-Trichloroethane	**23**	**230 d**	**23**	**230 d**	5
1,1,2-Trichloroethane	ND	ND	ND	ND	1
1,2-Dichloroethane	ND	ND	ND	ND	0.6
1,2-Dichloroethene(total)	ND	ND	ND	ND	5
Acetone	ND	ND	ND	ND	50*
Carbon Disulfide	ND	ND	ND	ND	N/A
Chloroethane	ND	ND	ND	ND	5
Chloroform	ND	ND	ND	ND	7
Methylene Chloride	ND	ND	ND	ND	5
Tetrachloroethene	1 j	11	1 j	**16**	5
Trichloroethene	ND	**6 j**	ND	**7 j**	5
Vinyl Chloride	ND	ND	ND	ND	2
Xylenes (total)	ND	ND	ND	ND	5
Total VOCs	28	**307**	28	**315**	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/l.
* - Value taken from NYSDEC Class GA Guidance Value.
(b) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
j - Estimated concentration; compound present below quantitation limit.
N/A - Not available.
ND - Not detected at analytical detection limit.
Note: - Numbers in bold exceed standard.

TABLE 5-6 (Page 8 of 12)

GROUNDWATER DATA SUMMARY
HYDROPUNCH SAMPLING
January February 2000

SDG Number	**128**	**128**	**128**	**128**	**NYSDEC**
Lab Sample Number	**B94860**	**B94861**	**B94862**	**B94863**	**CLASS GA**
LMS Sample ID	**GWHP-3 (98-100)**	**GWHP-3 (108-110)**	**GWHP-3 (118-120)**	**GWHP-3 (128-130)**	**STANDARDS (b)**
Date Collected	**2/4/2000**	**2/4/2000**	**2/4/2000**	**2/4/2000**	
VOLATILE ORGANICS (µg/l)					
1,1-Dichloroethane	2 j	ND	ND	1 j	5
1,1-Dichloroethene	3 j	ND	ND	ND	5
1,1,1-Trichloroethane	**38**	**7 j**	2 j	**9 j**	5
1,1,2-Trichloroethane	ND	ND	ND	ND	1
1,2-Dichloroethane	ND	ND	ND	ND	0.6
1,2-Dichloroethene(total)	ND	ND	ND	ND	5
Acetone	ND	ND	ND	ND	50*
Carbon Disulfide	ND	ND	ND	ND	N/A
Chloroethane	ND	ND	ND	ND	5
Chloroform	ND	ND	ND	ND	7
Methylene Chloride	ND	ND	ND	ND	5
Tetrachloroethene	**59**	**32**	**7 j**	**9 j**	5
Trichloroethene	**21**	**10**	2 j	3 j	5
Vinyl Chloride	ND	ND	ND	ND	2
Xylenes (total)	ND	ND	ND	ND	5
Total VOCs	**123**	49	11	22	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/l.
* - Value taken from NYSDEC Class GA Guidance Value.
(b) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
j - Estimated concentration; compound present below quantitation limit.
N/A - Not available.
ND - Not detected at analytical detection limit.
Note: - Numbers in bold exceed standard.

TABLE 5-6 (Page 9 of 12)

GROUNDWATER DATA SUMMARY
HYDROPUNCH SAMPLING
January February 2000

SDG Number	**128A**	**128A**	**128A**	**128A**	**NYSDEC**
Lab Sample Number	**B94864**	**B94865**	**B94866**	**B94867**	**CLASS GA**
LMS Sample ID	**TB-9**	**GWHP-3 (138-140)**	**GWHP-3 (148-150)**	**TB-10**	**STANDARDS (b)**
Date Collected	**2/7/2000**	**2/7/2000**	**2/7/2000**	**2/9/2000**	
VOLATILE ORGANICS (µg/l)					
1,1-Dichloroethane	ND	**14**	3 j	ND	5
1,1-Dichloroethene	ND	**7 j**	2 j	ND	5
1,1,1-Trichloroethane	ND	**59**	**13**	ND	5
1,1,2-Trichloroethane	ND	ND	ND	ND	1
1,2-Dichloroethane	ND	ND	ND	ND	0.6
1,2-Dichloroethene(total)	ND	ND	1 j	ND	5
Acetone	ND	ND	ND	ND	50*
Carbon Disulfide	ND	ND	ND	ND	N/A
Chloroethane	ND	ND	ND	ND	5
Chloroform	ND	ND	ND	ND	7
Methylene Chloride	ND	ND	ND	ND	5
Tetrachloroethene	ND	**15**	**27**	ND	5
Trichloroethene	ND	**6 j**	**13**	ND	5
Vinyl Chloride	ND	ND	ND	ND	2
Xylenes (total)	ND	ND	ND	ND	5
Total VOCs	ND	**134**	59	ND	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/l.
* - Value taken from NYSDEC Class GA Guidance Value.
(b) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
j - Estimated concentration; compound present below quantitation limit.
N/A - Not available.
ND - Not detected at analytical detection limit.
Note: - Numbers in bold exceed standard.

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GROUNDWATER DATA SUMMARY
HYDROPUNCH SAMPLING
January February 2000

SDG Number Lab Sample Number LMS Sample ID Date Collected	128A B94868 GWHP-4 (58-60) 2/9/2000	128A B94869 GWHP-4 (68-70) 2/9/2000	128A B94871 GWHP-4 (78-80) 2/9/2000	128A B94870 Equip. Rinsate 2/9/2000	NYSDEC CLASS GA STANDARDS (b)
VOLATILE ORGANICS (µg/l)					
1,1-Dichloroethane	ND	ND	ND	ND	5
1,1-Dichloroethene	ND	ND	ND	ND	5
1,1,1-Trichloroethane	ND	ND	ND	ND	5
1,1,2-Trichloroethane	ND	ND	ND	ND	1
1,2-Dichloroethane	ND	ND	ND	ND	0.6
1,2-Dichloroethene(total)	ND	ND	ND	ND	5
Acetone	ND	ND	ND	ND	50*
Carbon Disulfide	ND	ND	ND	ND	N/A
Chloroethane	ND	ND	ND	ND	5
Chloroform	ND	3 j	1 j	ND	7
Methylene Chloride	ND	ND	ND	ND	5
Tetrachloroethene	**8 j**	ND	ND	ND	5
Trichloroethene	ND	ND	ND	ND	5
Vinyl Chloride	ND	ND	ND	ND	2
Xylenes (total)	ND	ND	ND	ND	5
Total VOCs	8	3	1	ND	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/l.
* - Value taken from NYSDEC Class GA Guidance Value.
(b) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
j - Estimated concentration; compound present below quantitation limit.
N/A - Not available.
ND - Not detected at analytical detection limit.
Note: - Numbers in bold exceed standard.

GROUNDWATER DATA SUMMARY
HYDROPUNCH SAMPLING
January February 2000

SDG Number Lab Sample Number LMS Sample ID Date Collected	128A B94872 GWHP-4 (88-90) 2/9/2000	128A B94873 GWHP-4 (108-110) 2/9/2000	128A B94874 GWHP-4 (118-120) 2/10/2000	128A B94875 GWHP-4 (138-140) 2/10/2000	NYSDEC CLASS GA STANDARDS (b)
VOLATILE ORGANICS (µg/l)					
1,1-Dichloroethane	ND	ND	ND	ND	5
1,1-Dichloroethene	ND	ND	ND	ND	5
1,1,1-Trichloroethane	ND	ND	1 j	ND	5
1,1,2-Trichloroethane	ND	ND	ND	ND	1
1,2-Dichloroethane	ND	ND	ND	ND	0.6
1,2-Dichloroethene(total)	ND	ND	ND	ND	5
Acetone	1 j	ND	ND	ND	50*
Carbon Disulfide	ND	ND	ND	ND	N/A
Chloroethane	ND	ND	ND	ND	5
Chloroform	ND	1 j	ND	ND	7
Methylene Chloride	ND	ND	ND	ND	5
Tetrachloroethene	ND	ND	ND	ND	5
Trichloroethene	ND	ND	ND	ND	5
Vinyl Chloride	ND	ND	ND	ND	2
Xylenes (total)	ND	ND	ND	ND	5
Total VOCs	1	1	1	ND	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/l.
* - Value taken from NYSDEC Class GA Guidance Value.
(b) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
j - Estimated concentration; compound present below quantitation limit.
N/A - Not available.
ND - Not detected at analytical detection limit.
Note: - Numbers in bold exceed standard.

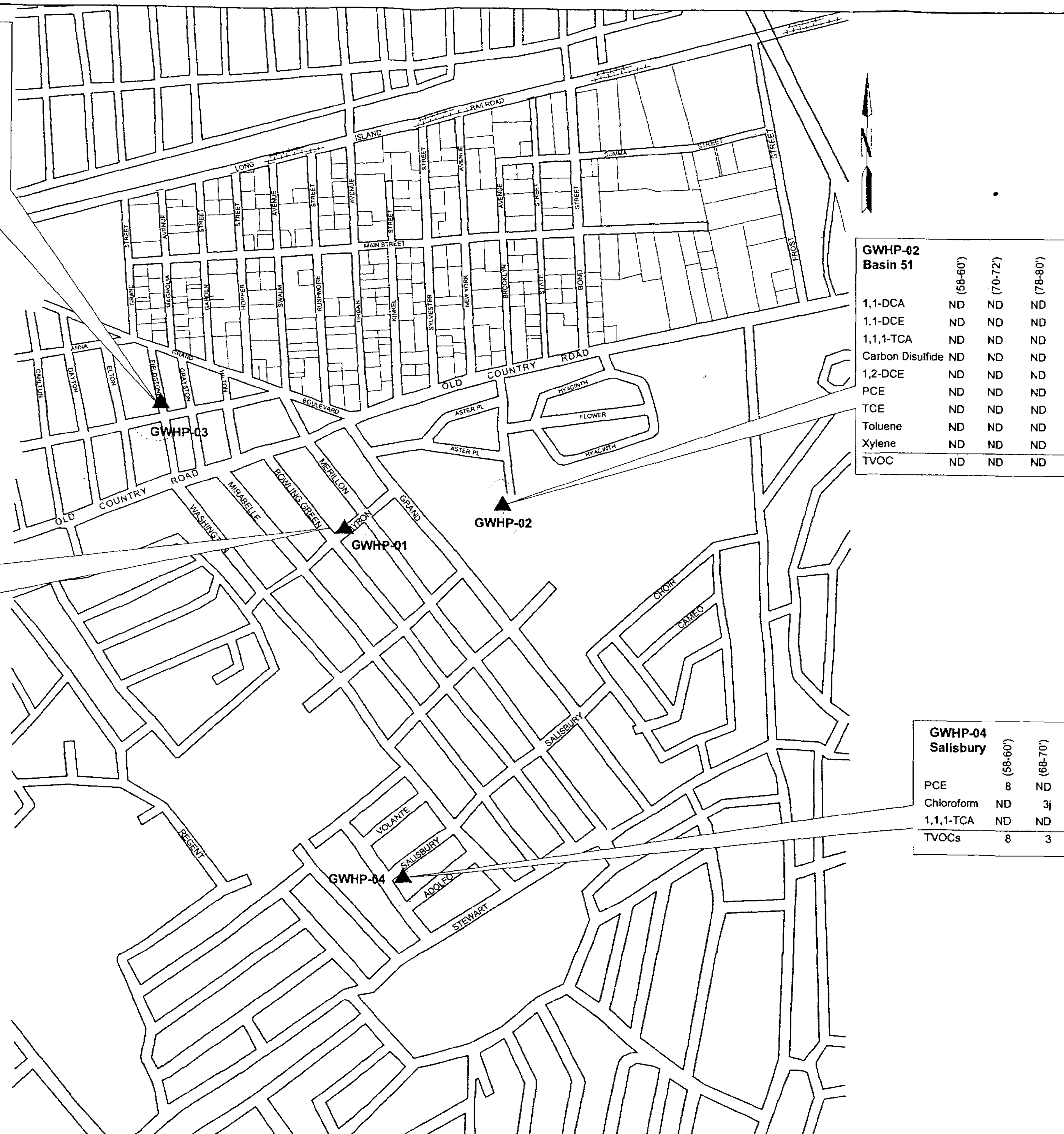
GROUNDWATER DATA SUMMARY
HYDROPUNCH SAMPLING
January February 2000

SDG Number Lab Sample Number LMS Sample ID Date Collected	128A B94878 GWHP-4 (148-150) 2/11/2000	128A B94877 TB-11 2/11/2000	NYSDEC CLASS GA STANDARDS (b)
VOLATILE ORGANICS (µg/l)			
1,1-Dichloroethane	ND	ND	5
1,1-Dichloroethene	ND	ND	5
1,1,1-Trichloroethane	1 j	ND	5
1,1,2-Trichloroethane	ND	ND	1
1,2-Dichloroethane	ND	ND	0.6
1,2-Dichloroethene(total)	ND	ND	5
Acetone	ND	ND	50*
Carbon Disulfide	ND	ND	N/A
Chloroethane	ND	ND	5
Chloroform	ND	ND	7
Methylene Chloride	ND	ND	5
Tetrachloroethene	ND	ND	5
Trichloroethene	ND	ND	5
Vinyl Chloride	ND	ND	2
Xylenes (total)	ND	ND	5
Total VOCs	1	ND	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations t the Division of Water Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less tha
* - Value taken from NYSDEC Class GA Guidance Value.
(b) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
j - Estimated concentration; compound present below quantitation limit.
N/A - Not available.
ND - Not detected at analytical detection limit.
Note: - Numbers in bold exceed standard.

GWHP-03 Fieldstone	(58-60')	(68-70')	(78-80')	(88-90')	(98-100')	(108-110')	(118-120')	(128-130')	(138-140')	(148-150')
1,1-DCA	6	2j	46	36	2j	ND	ND	1j	14	5j
1,1-DCE	ND	2j	24	26	3j	ND	ND	ND	7j	2j
1,1,1-TCA	ND	23	230	230	38	7j	2j	9j	59	13
1,2-DCE	ND	ND	ND	ND	ND	ND	ND	ND	ND	15
PCE	ND	2	11	16	59	32	7j	9j	15	27
TCE	ND	ND	6	7	21	10	2j	3j	6j	13
TVOC	6	28	307	315	123	49	11	22	134	59

GWHP-01 Myron	(60')	(70')	(80')	(90')	(98')	(108')	(118')	(128')	(138')	(148')
1,1-DCA	ND	ND	ND	12	110	200	190d	750d	880d	ND
1,1-DCE	ND	ND	ND	24	260d	360d	460d	1600d	1700d	4j
1,1,1-TCA	ND	ND	ND	21	180d	270d	260d	790d	820d	4j
1,1.2-TCA	ND	ND	ND	ND	1j	2j	2j	6j	8j	ND
1,2-DCA	ND	ND	ND	ND	ND	ND	4j	16	22	ND
1,2-DCE ttl	ND	ND	ND	ND	29	46	65	94	77	ND
Chloroethane	ND	ND	ND	ND	2j	ND	ND	ND	ND	ND
Chloroform	2j	ND	2j	2j	3j	5j	6j	8j	8j	2j
PCE	ND	ND	ND	5j	51	76	86	180	160jd	ND
TCE	ND	ND	ND	17	220d	300d	420d	1800d	1800d	6j
VinylChlor	ND	ND	ND	ND	ND	ND	ND	6j	5j	ND
Xylenes ttl	ND	ND	ND	ND	ND	ND	2j	ND	ND	ND
TVOCS	2	ND	2	79	856	1262	1495	5250	5480	12



GWHP-02 Basin 51	(58-60')	(70-72')	(78-80')	(94-96')	(100-102')	(108-110')	(118-120')	(118-120')	(138-140')	(148-150')
1,1-DCA	ND	ND	ND	ND	8	3j	2j	2j	ND	8
1,1-DCE	ND	ND	ND	ND	ND	ND	ND	ND	ND	2
1,1,1-TCA	ND	ND	ND	ND	ND	ND	ND	ND	ND	4
Carbon Disulfide	ND	ND	ND	2j	ND	ND	ND	ND	ND	ND
1,2-DCE	ND	ND	ND	ND	ND	ND	ND	ND	ND	2
PCE	ND	ND	ND	ND	ND	ND	ND	ND	ND	5
TCE	ND	ND	ND	ND	ND	ND	ND	ND	ND	10
Toluene	ND	ND	ND	ND	ND	1	2j	1j	ND	ND
Xylene	ND	ND	ND	ND	ND	3j	3j	3j	ND	ND
TVOC	ND	ND	ND	2	8	7	6	6	ND	31

GWHP-04 Salisbury	(58-60')	(68-70')	(78-80')	(88-90')	(108-110')	(118-120')	(138-140')	(148-150')
PCE	8	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	3j	1j	ND	1j	ND	ND	ND
1,1,1-TCA	ND	ND	ND	ND	ND	1j	ND	1j
TVOCs	8	3	1	ND	1j	1	ND	1

Legend

▲ Hydropunch location

All results given in ppb

0 600 ft

APPROX. SCALE
1 in. = 600 ft

Figure 5-4

Hydropunch Groundwater Data Summary January & February 2000

OFFSITE GROUNDWATER
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

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Pearl River, New York

R2-0000426

exhibit VOC concentration in excess of the Class GA groundwater standards. Total VOC concentrations at this location ranged from 6 (58 to 60 ft. sample) to 315 μg/l (78 to 80 ft. sample). 1,1,1-TCA was the primary contaminant detected, significant concentrations of PCE, TCE, and it's breakdown products were also found (Figure 5-4). The highest VOC concentrations were found between 80 and 100 ft below the ground surface.

The analytical results for GWHP-04 indicate that only trace levels of VOC are present at this location (Figure 5-4). Only one of the samples (58 to 60 ft.) that were collected exhibited VOC concentrations in excess of the Class GA groundwater standards. PCE was found in this sample at a concentration of 8 μg/l.

5.3 DATA ANALYSIS AND AREAS OF IMPACTED GROUNDWATER

The groundwater contamination problem associated with the NCIA was first discovered in 1985 (NCDOH 1986). Since that time several extensive sampling efforts have been conducted at the NCIA to determine the sources and extent of this contamination. A major portion of the effort of this off-site groundwater RI has been to compile and interpret the historical data to determine the fate and transport of the contaminants as they relate to off-site locations.

5.3.1 Area of Historically Impacted Groundwater

The area of historically impacted groundwater is shown on Figures 5-5 to Figure 5-8. The purpose of these figures is to illustrate the historical extent of the VOC contamination associated with the NCIA. The impacted area was determined by extracting the highest total VOC result for each of the availible groundwater sampling points including monitoring wells, geoprobes, and hydropunch sampling locations. These results were then contoured to provide an indication of the extent and maximum VOC concentrations that have historically been found within the impacted area between the late 1970's and the present. Each of the concentration areas enclosed by the contours is somewhat generalized in that some of the data points within them may exhibit higher or lower concentrations. The purpose of these figures is to depict the maximum extent of the groundwater contamination. The individual figures are broken down by depth to show the various levels of groundwater contamination with depth. The 0 to 64 ft below ground surface figure is intended to show

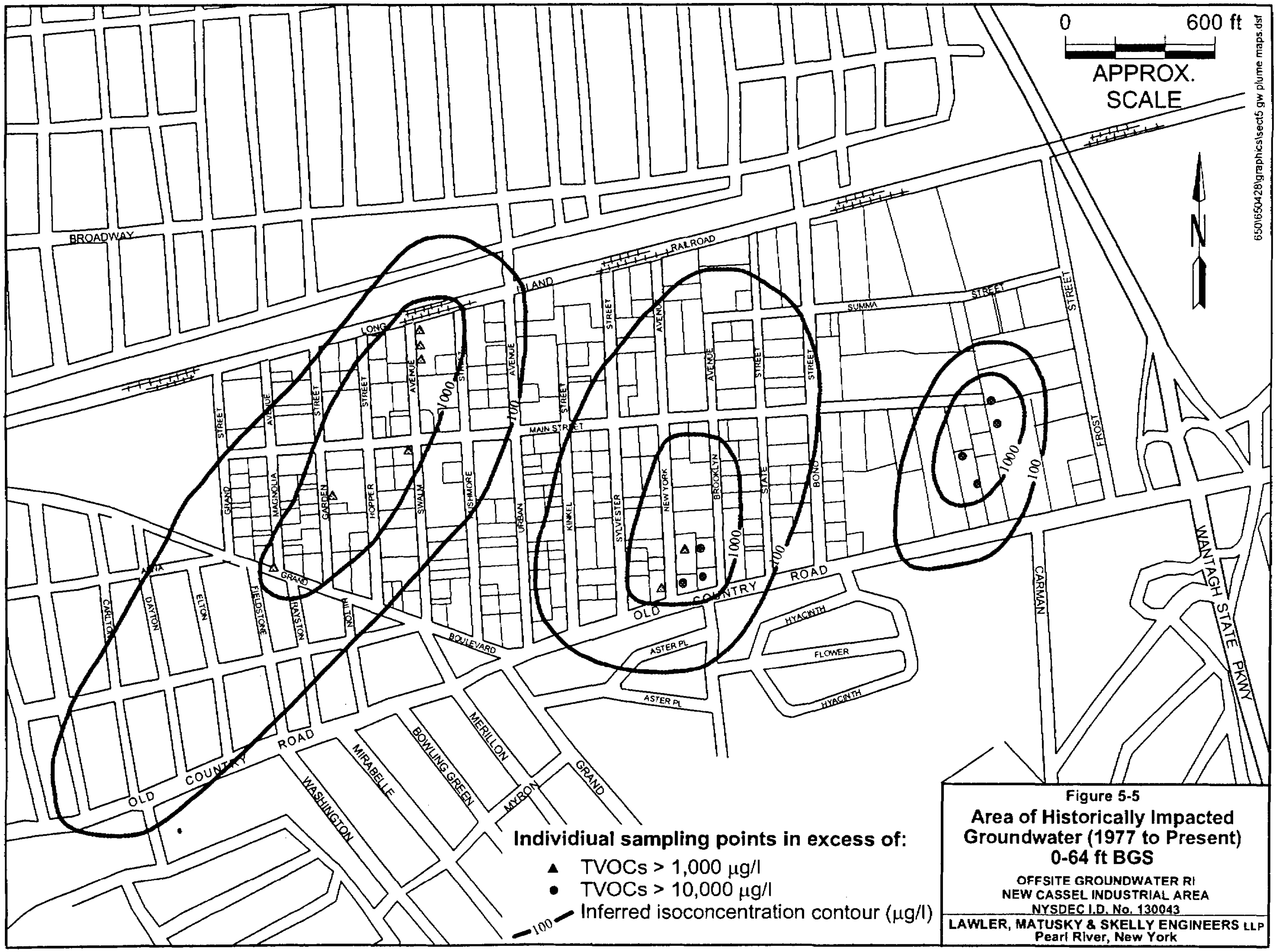

Figure 5-5
Area of Historically Impacted Groundwater (1977 to Present) 0-64 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043
LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

R2-0000428

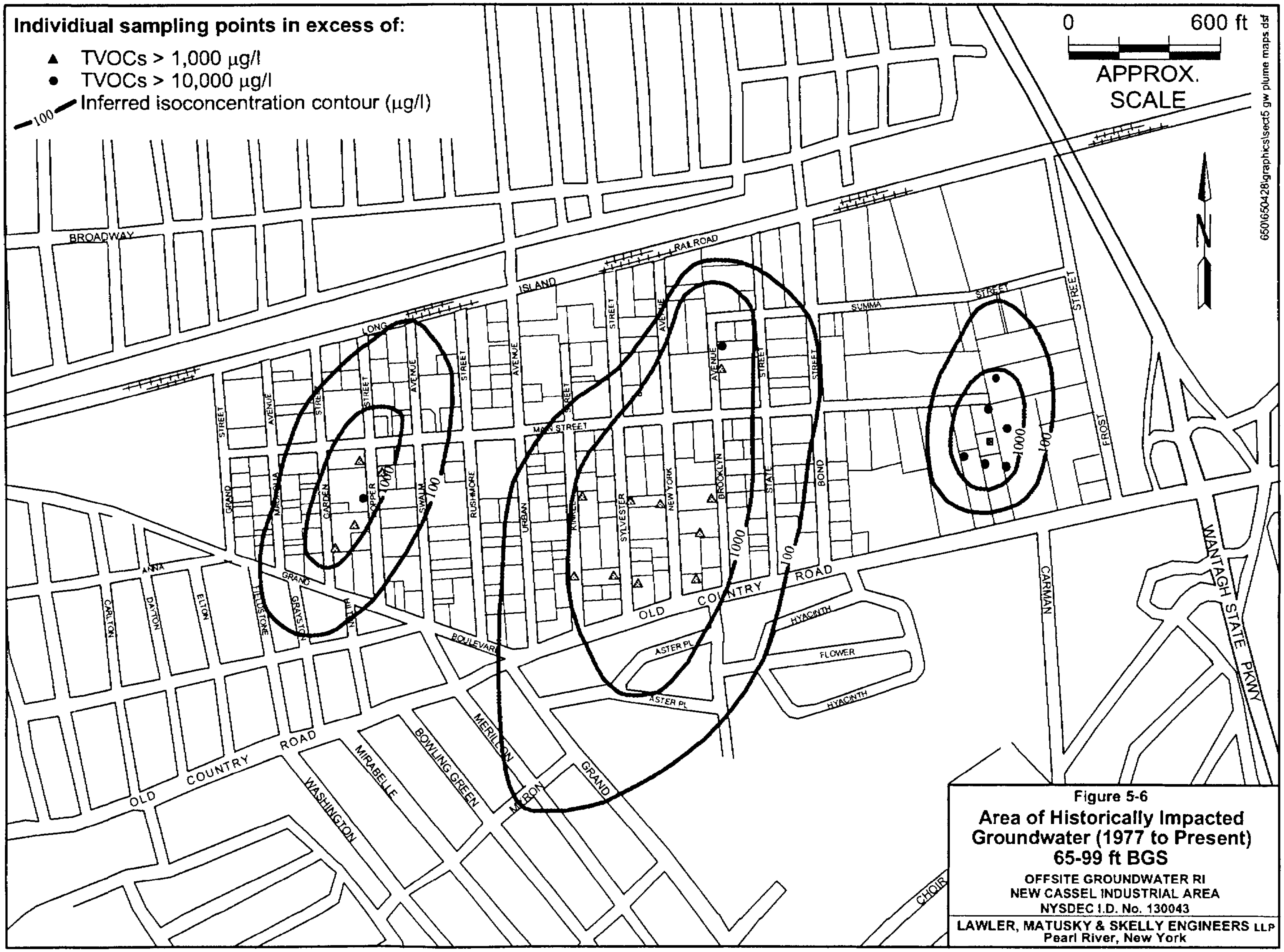

Figure 5-6

Area of Historically Impacted Groundwater (1977 to Present) 65-99 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

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Pearl River, New York

Figure 5-7
Area of Historically Impacted Groundwater (1977 to Present)
100-124 ft BGS
OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043
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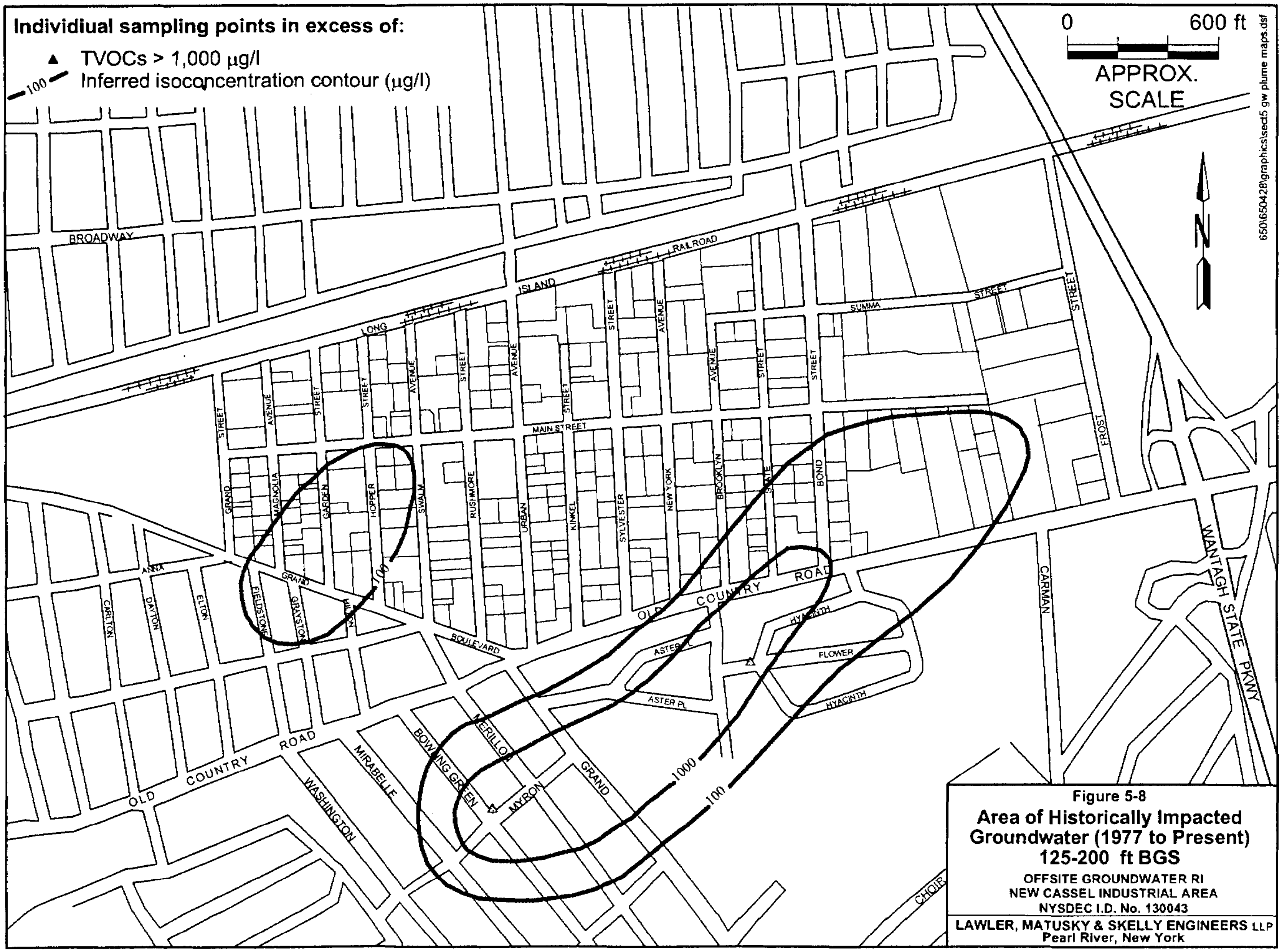

Figure 5-8
Area of Historically Impacted Groundwater (1977 to Present) 125-200 ft BGS
OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043
LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

the levels of contamination found in the immediate vicinity of the watertable. The 65 to 99 ft. below ground surface depicts the contaminant levels at the transition zone between the UGA and the Magothy Aquifer. The remaining two figure depict the contaminant levels in the upper Magothy Aquifer. Two separate depth intervals (100 to 124 ft. and 125 to 200 ft.) are presented since to was noted that a distinctly different distribution of contaminants was noted between the two depth intervals. Due to the limited data available for depths greater than 200 ft the distribution of contaminants at the deeper depths was not plotted.

5.3.2 Area of Impacted Groundwater 1998 to 2000

The groundwater contaminant plume configuration based on the data collected since September 1998 is shown on Figure 5-9 to Figure 5-12. The purpose of these figures is to show the generalized present day configuration of the groundwater contamination plume. These figures are also broken down into the same depth intervals presented for the historical data.

5.3.3 Temporal Variations in Groundwater Quality

In order to compare the groundwater contaminant distribution to the present day distribution and the historical area of impacted groundwater plume configuration maps were prepared using the data collected over 3 separate intervals of time. Earliest data from the NCIA area dates back to 1977, however it is not until the early 1990's that sufficient data is available for analysis. The selected intervals of time include the data collected prior to 1993 (Figures 5-13 to 5-16), from 1993 to 1996 (Figure 5-17 to 5-20), and 1996 to 2000 (Figure 5-21 to 5-24). The intervals were selected based on an analysis of the database to insure that sufficient data fell between the time interval to provide a reasonable representation of the plume configuration. Over some of the time intervals only minimal data for the deeper depths are available for analysis. For those depth intervals over time with limited data the data was not contoured. For these figures the values for total VOCs for the individual points is presented directly on the figure.

In addition to the plume configuration maps concentration vs. time plots for individual wells were prepared and are presented in Appendix G. The wells included in this analysis were selected from the database based on the number of sampling events over the time period of interest. Currently the database contains groundwater quality information for 182

Figure 5-9

Area of Impacted Groundwater Based on Data From September 1998 to Present 0-64 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

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Pearl River, New York

650650428\graphics\sect5 gw plume maps.dsf

Figure 5-10
Area of Impacted Groundwater Based on Data From September 1998 to Present 65-99 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

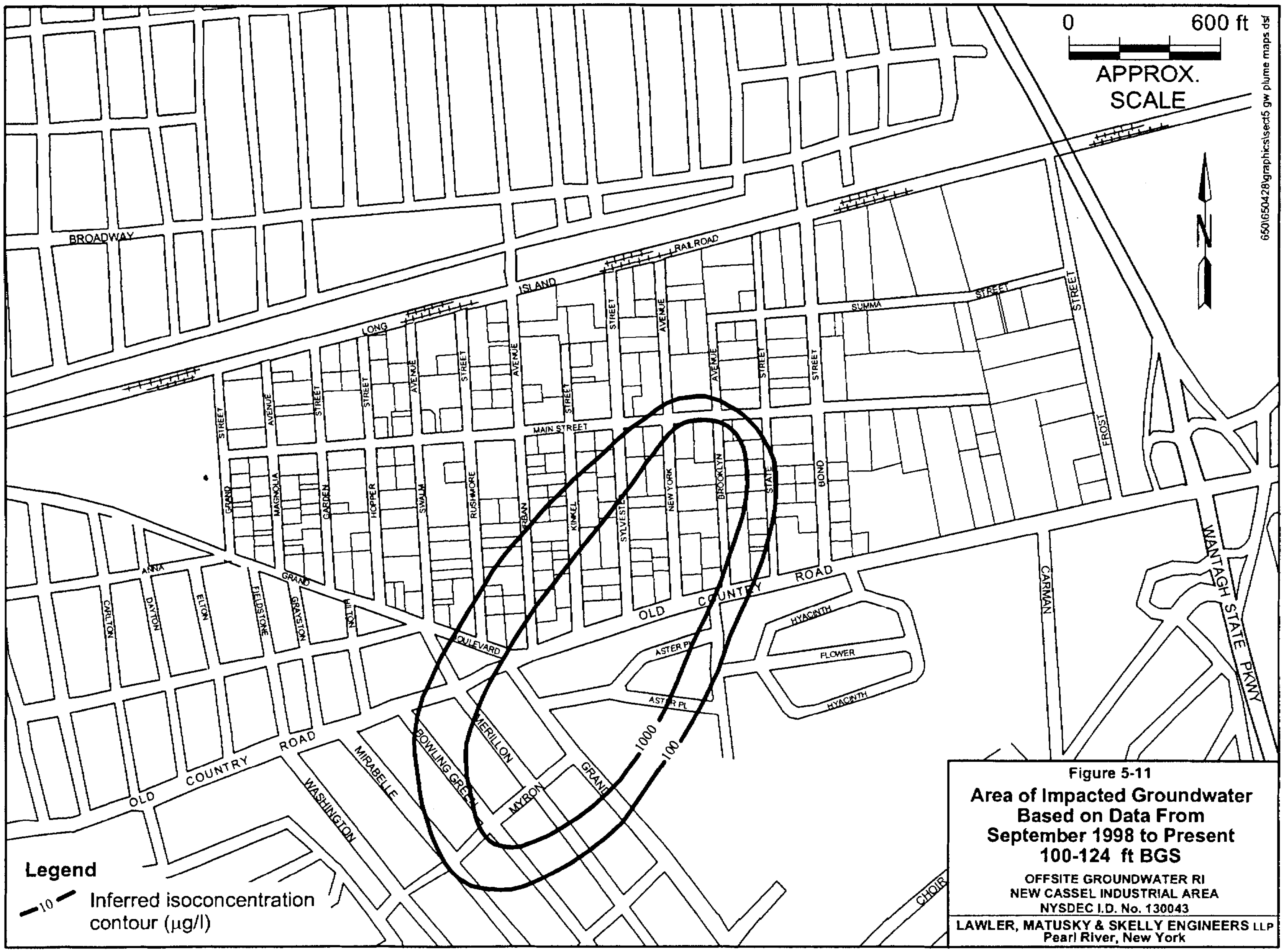

Figure 5-11

Area of Impacted Groundwater Based on Data From September 1998 to Present 100-124 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

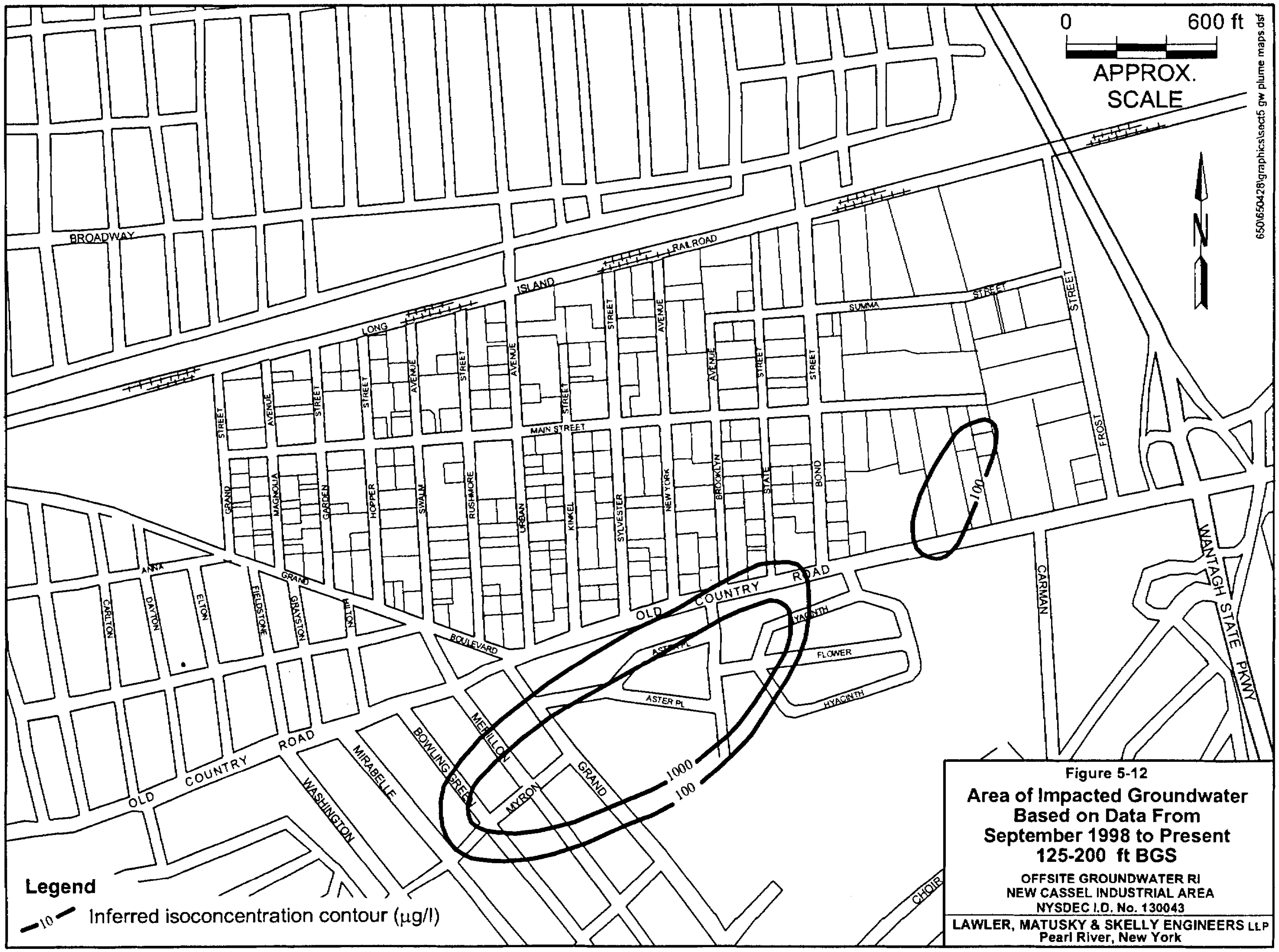

Figure 5-12

Area of Impacted Groundwater Based on Data From September 1998 to Present 125-200 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

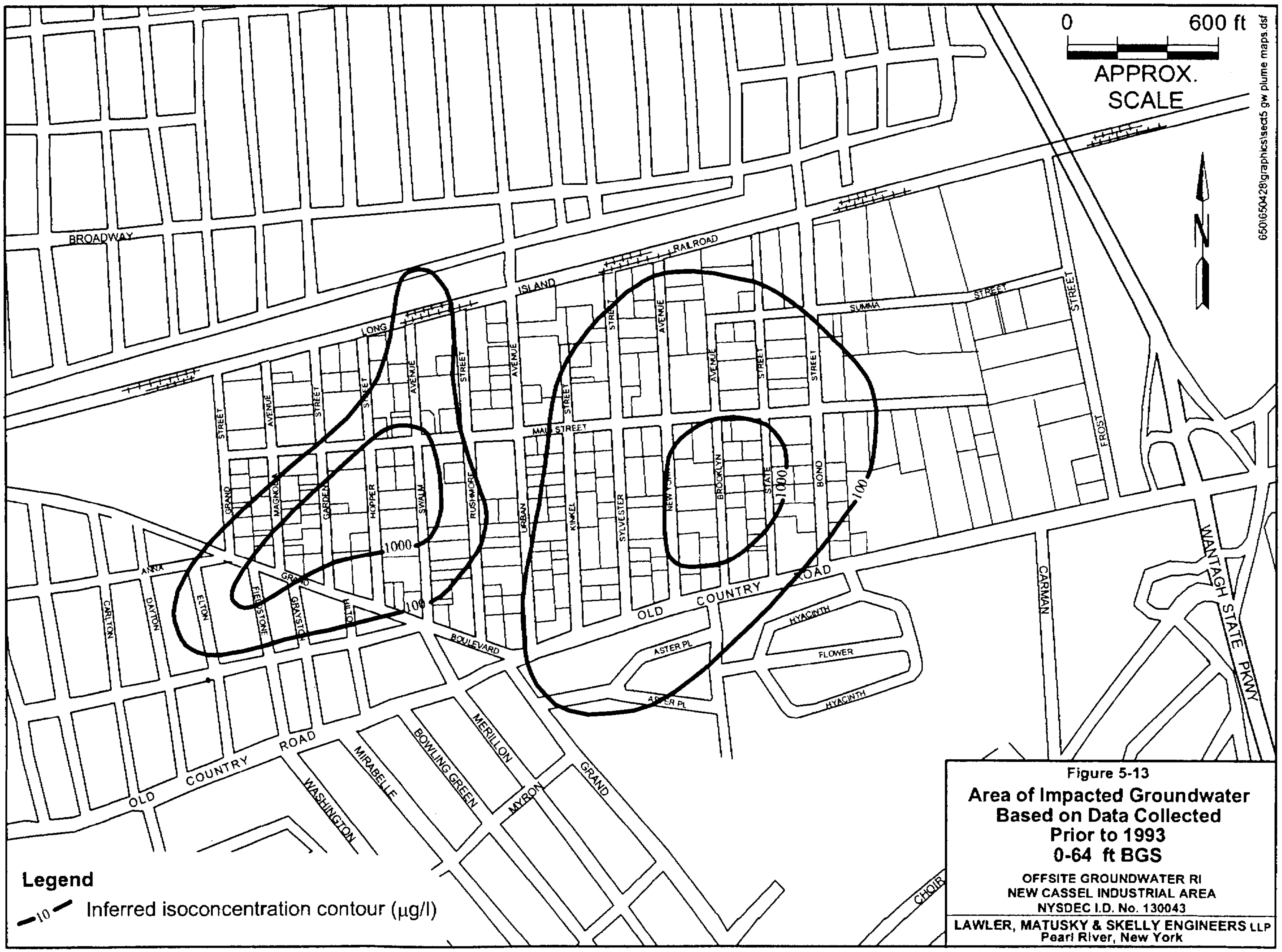

Figure 5-13

Area of Impacted Groundwater Based on Data Collected Prior to 1993 0-64 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

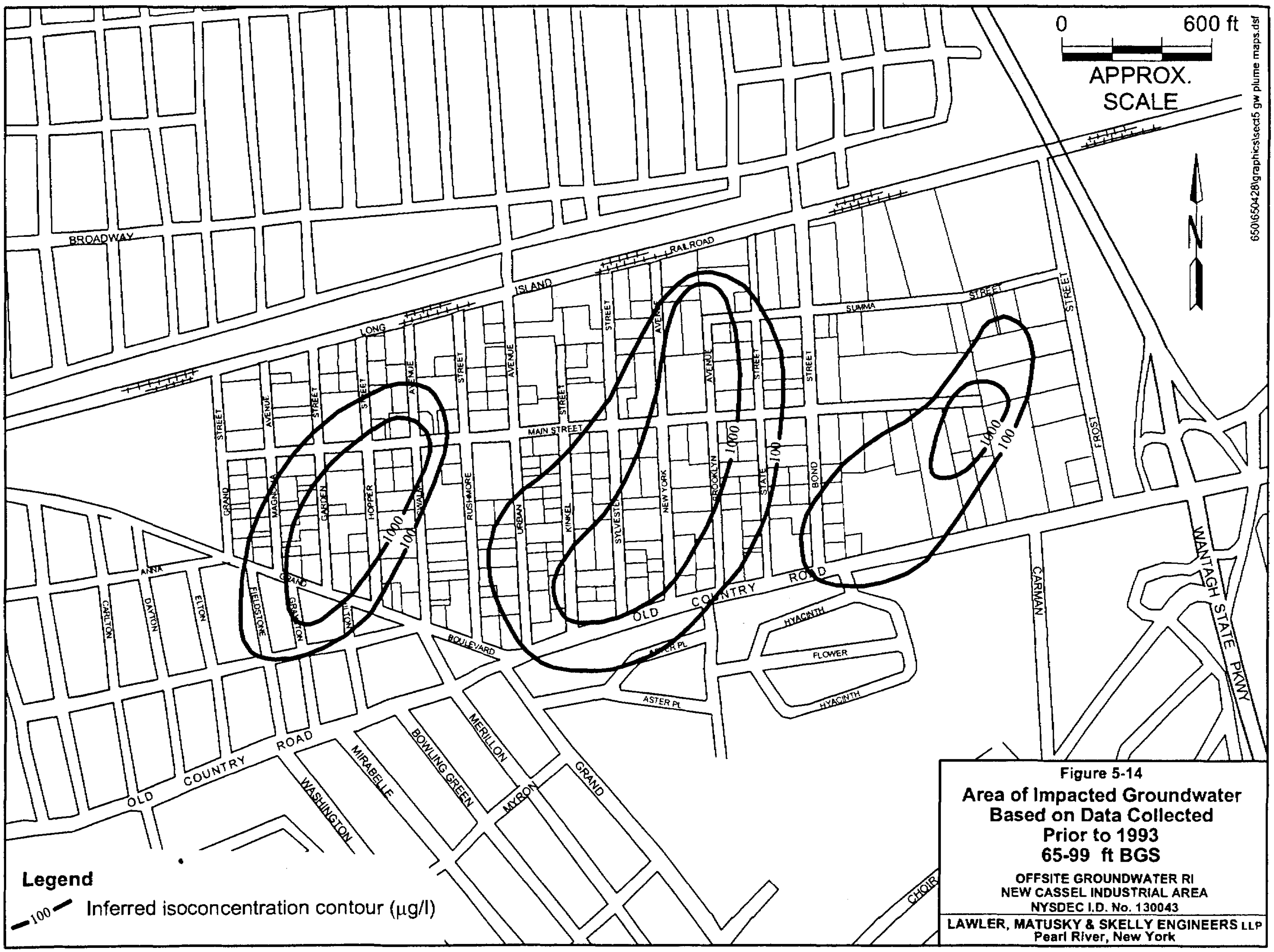

Figure 5-14

Area of Impacted Groundwater Based on Data Collected Prior to 1993 65-99 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

R2-0000438

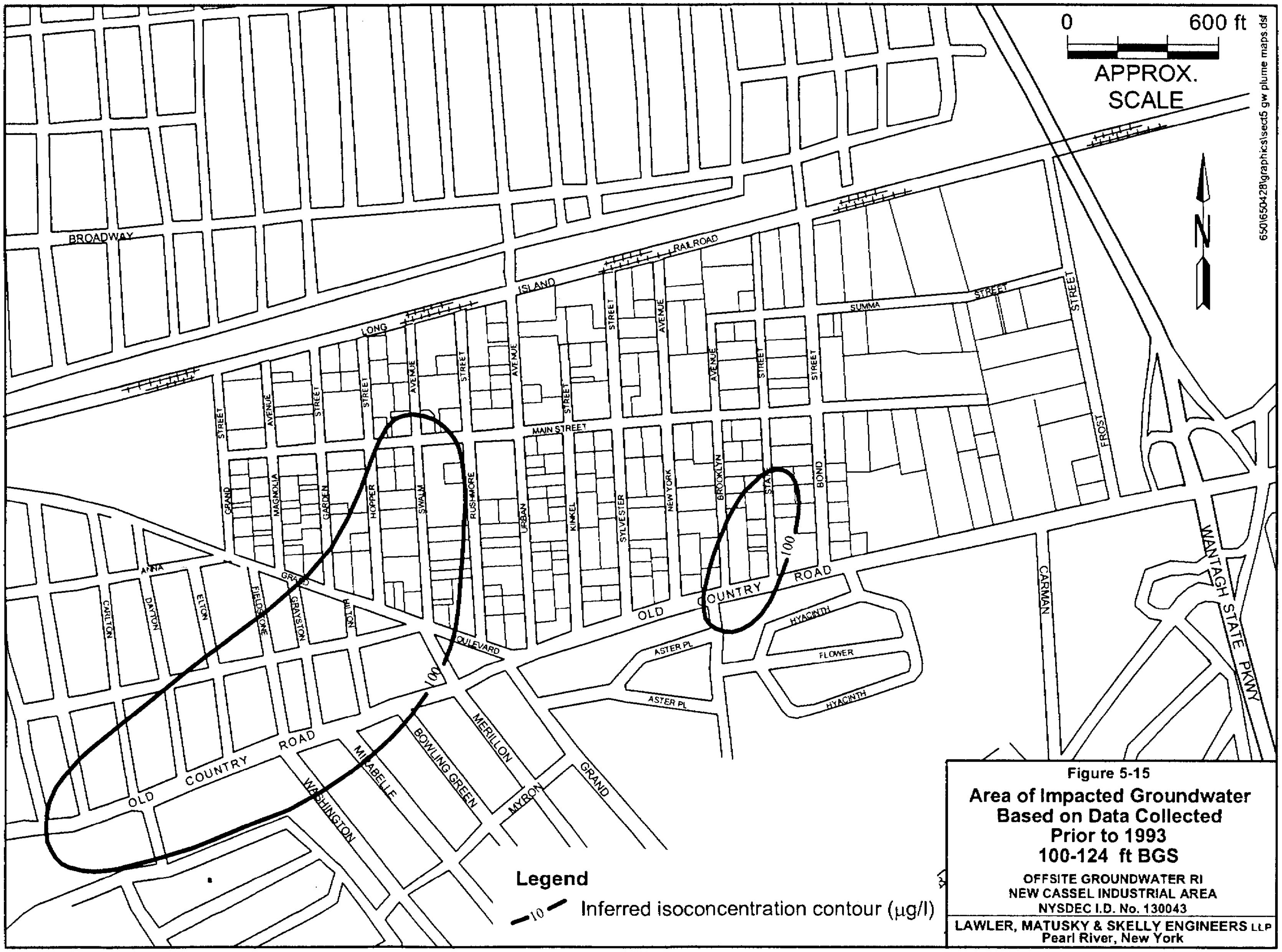

Figure 5-15

Area of Impacted Groundwater Based on Data Collected Prior to 1993 100-124 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

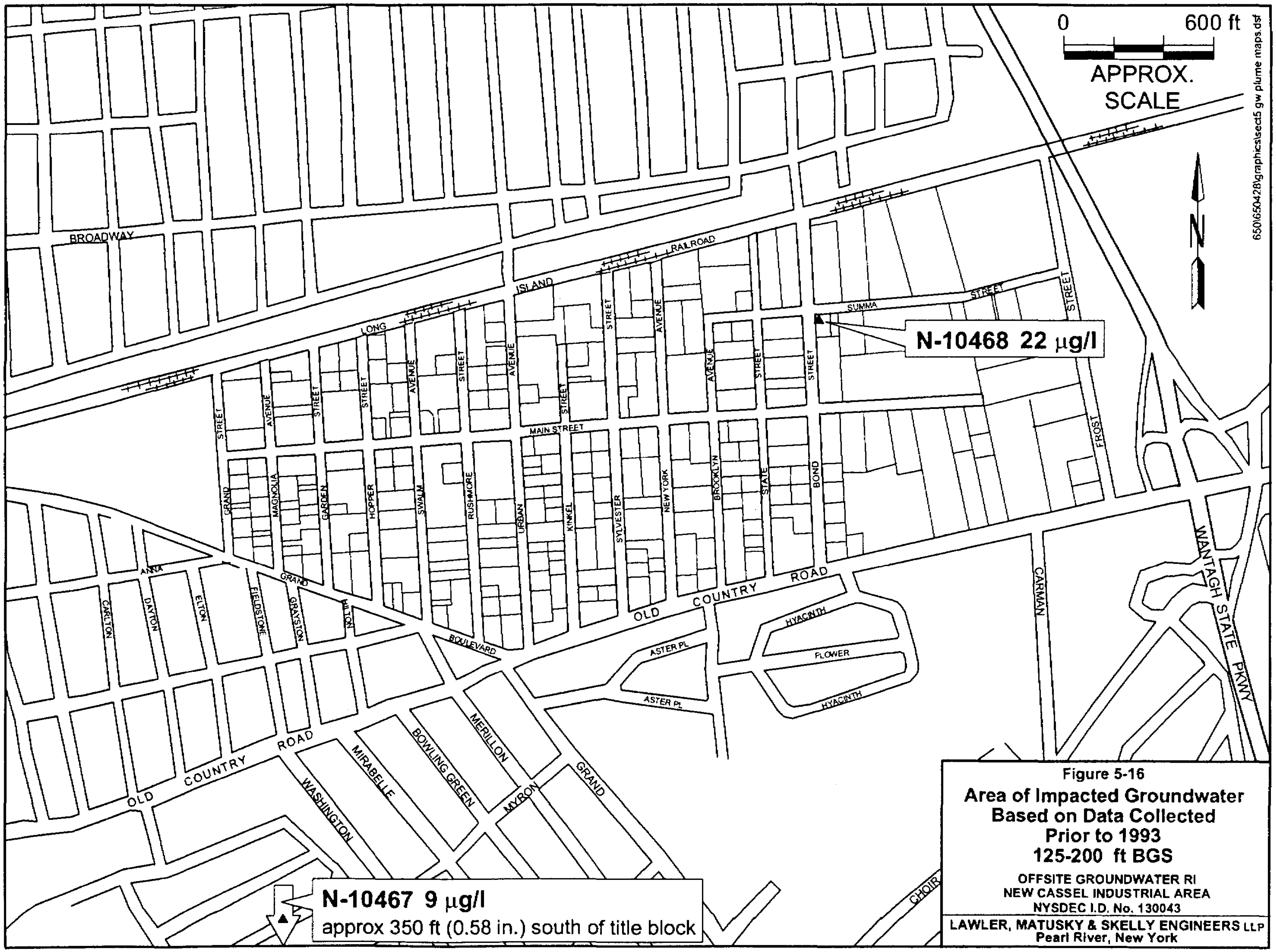

Figure 5-16

Area of Impacted Groundwater Based on Data Collected Prior to 1993 125-200 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

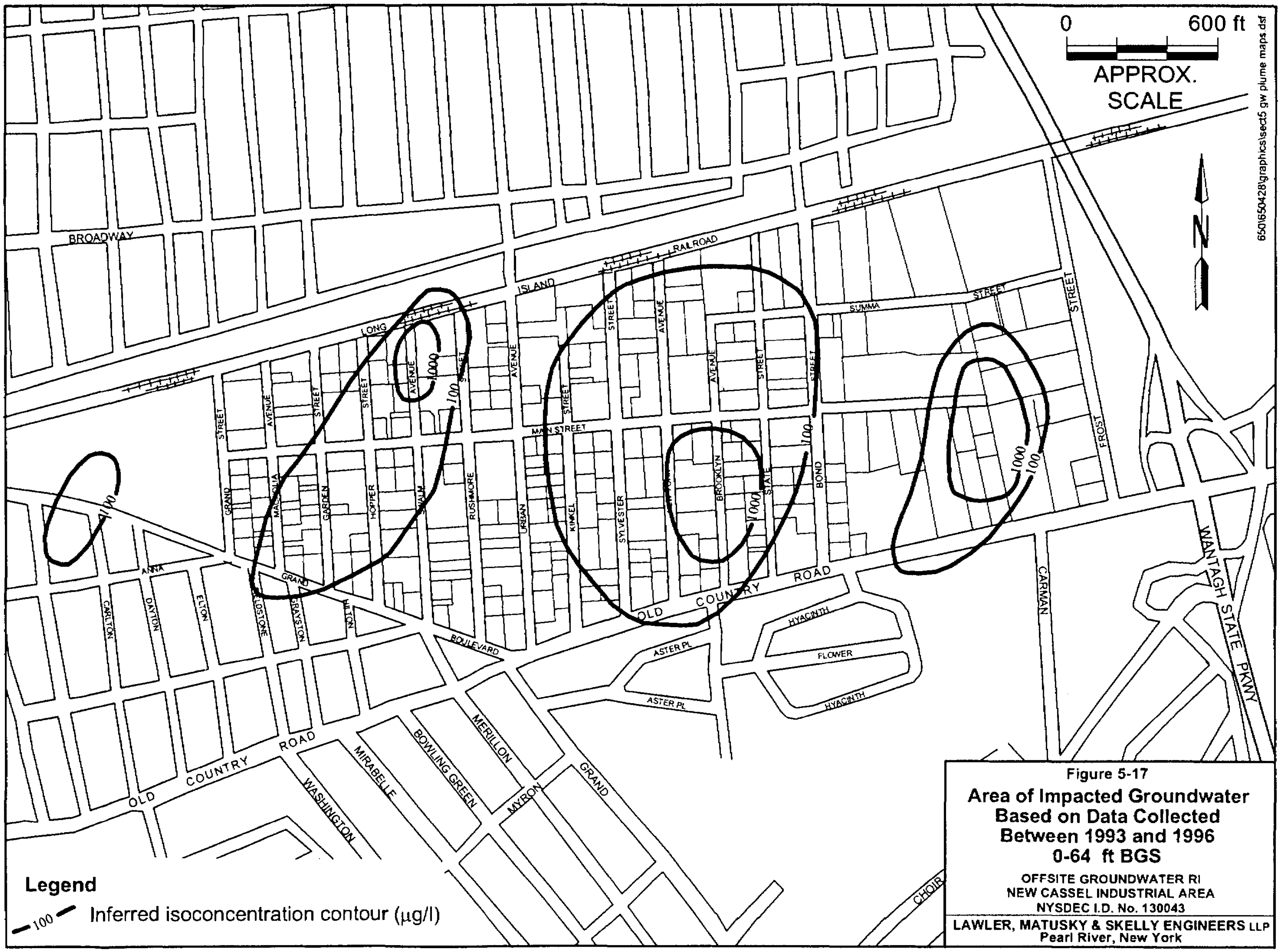

Figure 5-17

Area of Impacted Groundwater Based on Data Collected Between 1993 and 1996 0-64 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

Legend

100 Inferred isoconcentration contour (μg/l)

R2-0000441

Legend
100 Inferred isoconcentration contour (µg/l)

Figure 5-18
Area of Impacted Groundwater Based on Data Collected Between 1993 and 1996 65-99 ft BGS
OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043
LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

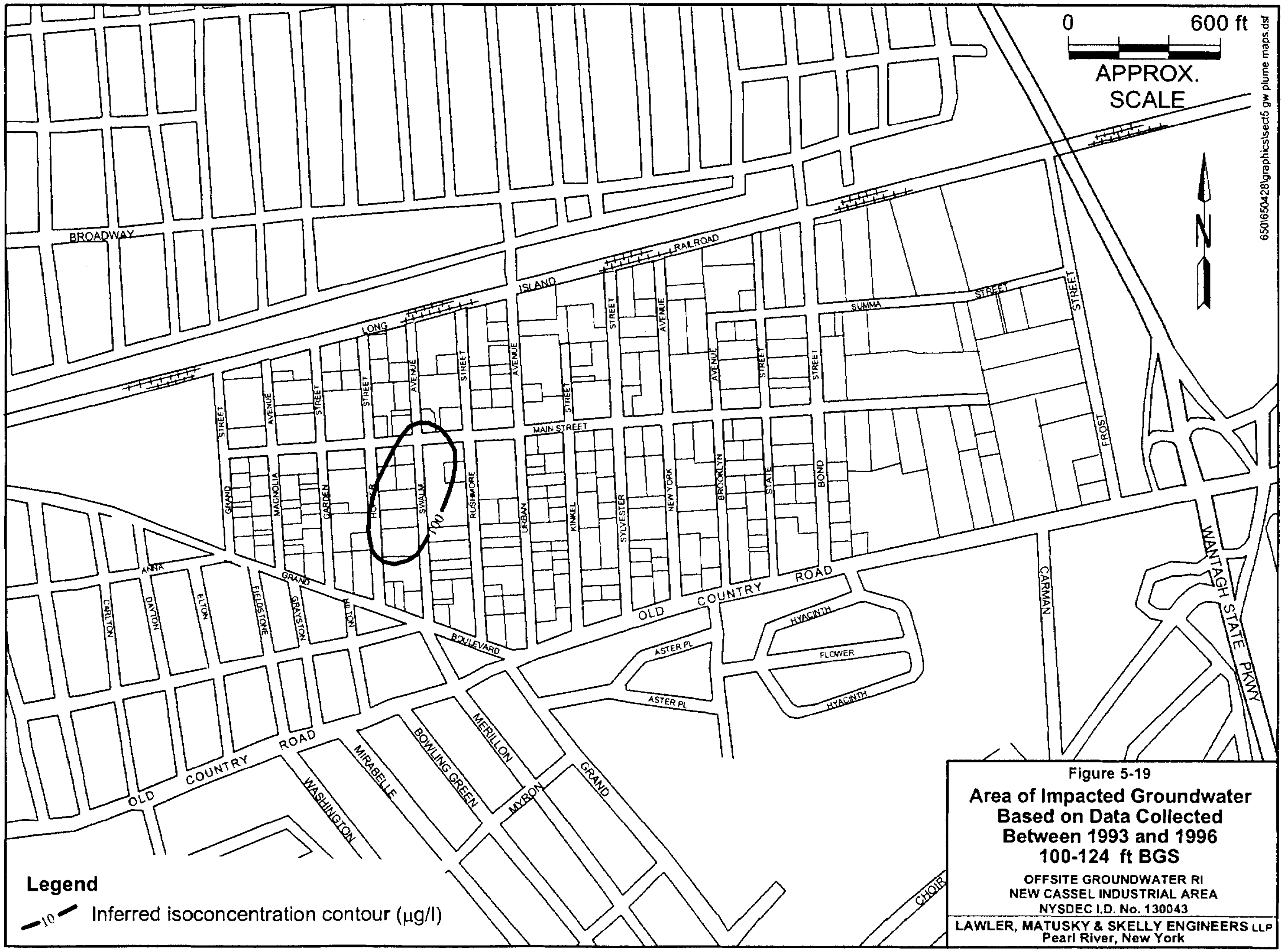

Figure 5-19

Area of Impacted Groundwater Based on Data Collected Between 1993 and 1996 100-124 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

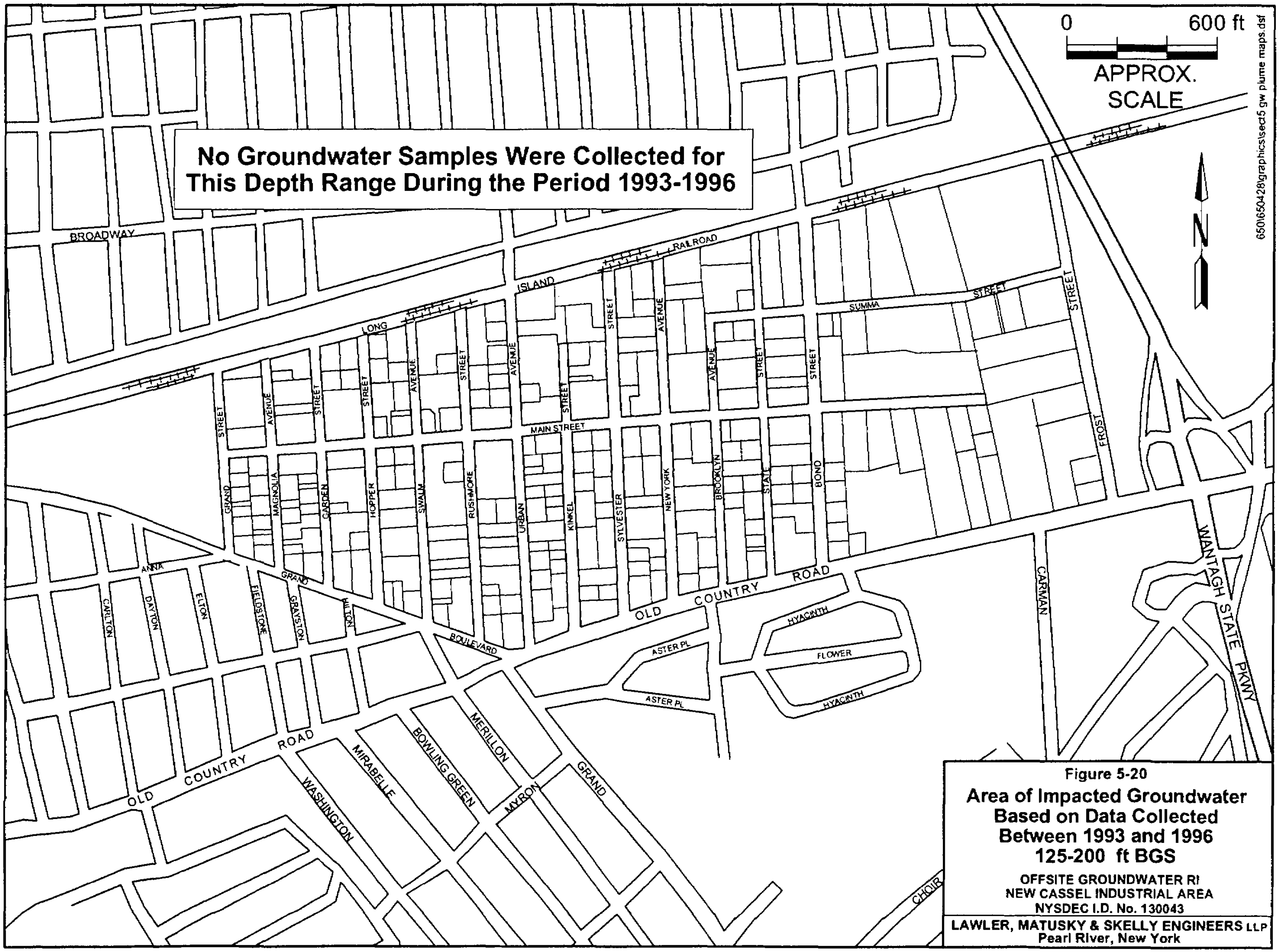

Figure 5-20

Area of Impacted Groundwater Based on Data Collected Between 1993 and 1996 125-200 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

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Pearl River, New York

Figure 5-21

Area of Impacted Groundwater Based on Data Collected Between 1996 and 2000 0-64 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

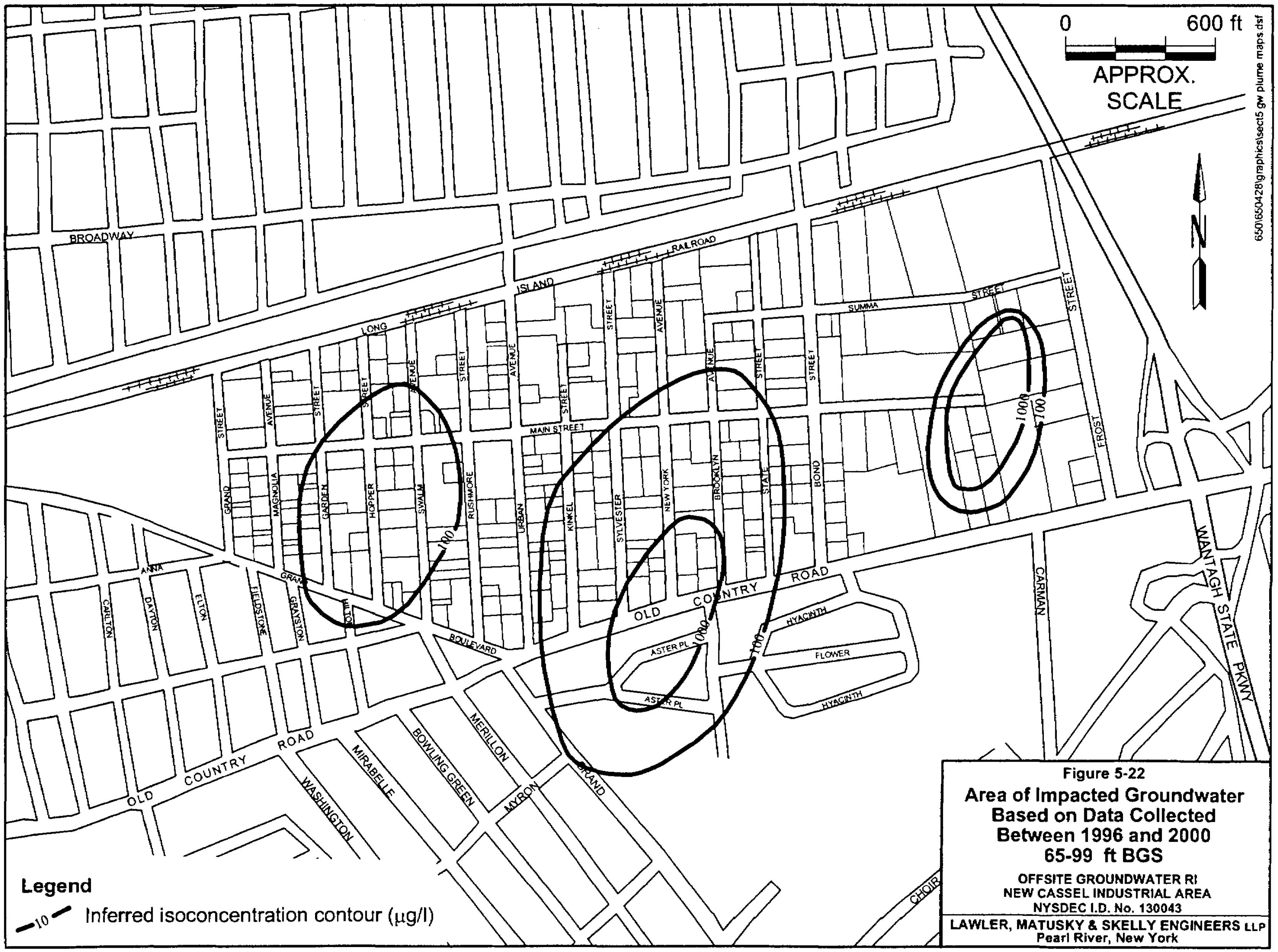

Figure 5-22
Area of Impacted Groundwater Based on Data Collected Between 1996 and 2000 65-99 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

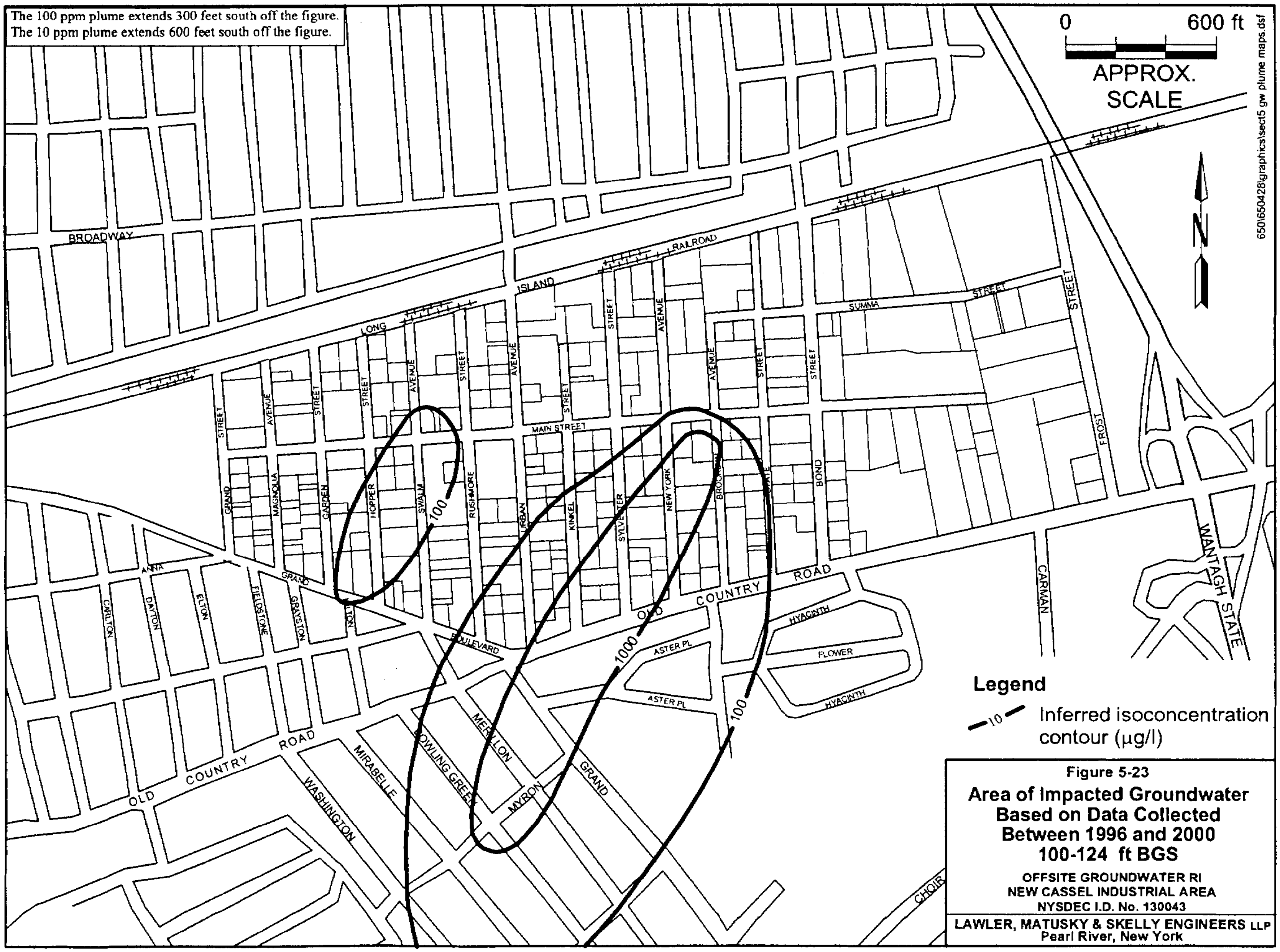

Figure 5-23
Area of Impacted Groundwater Based on Data Collected Between 1996 and 2000 100-124 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

R2-0000447

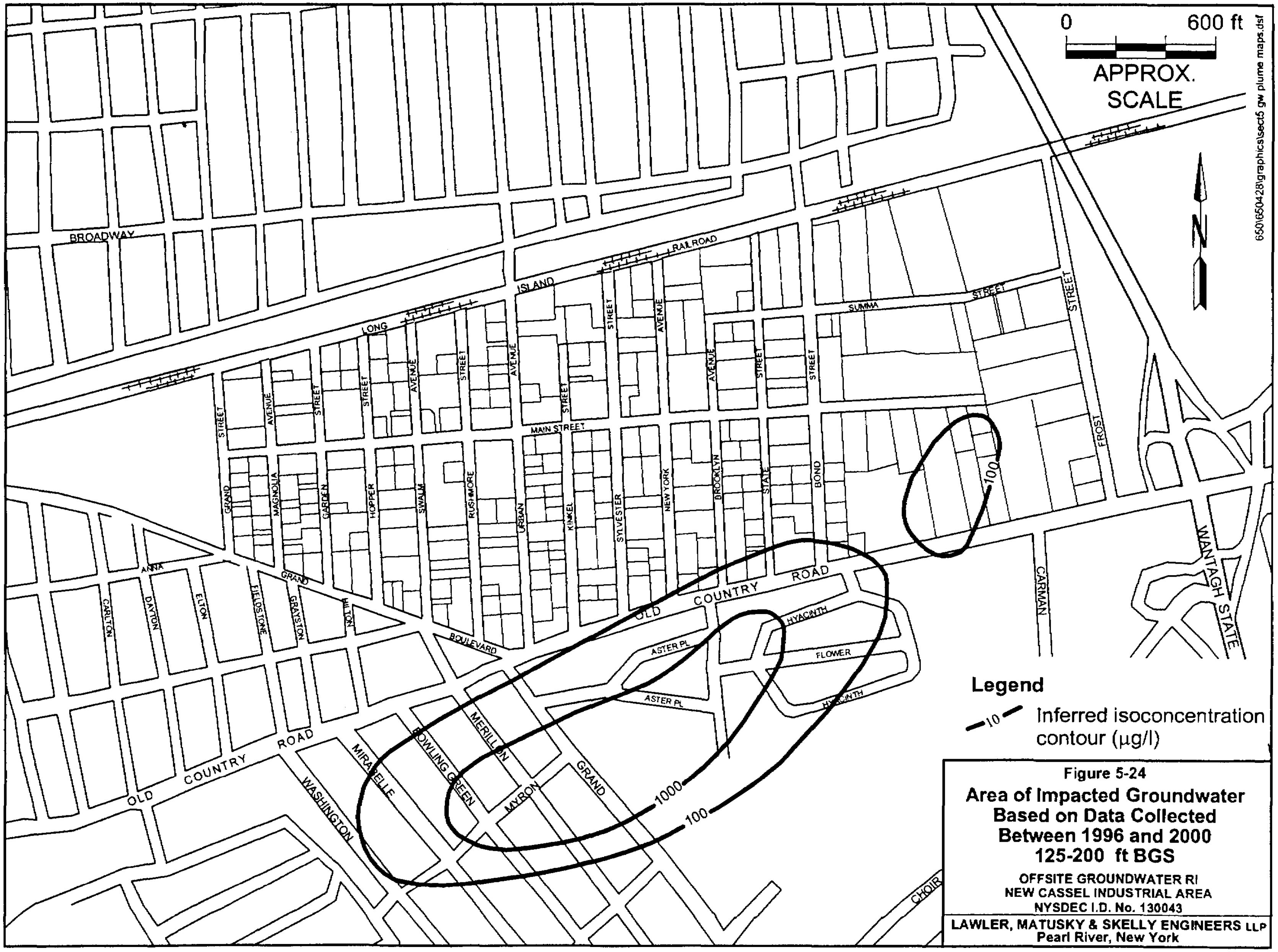

Figure 5-24
Area of Impacted Groundwater Based on Data Collected Between 1996 and 2000 125-200 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

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Pearl River, New York

natural variation it was believed that a minimum of six data points were needed to establish a trend. Of the 40 wells, 12% exhibit an apparent increasing trend in total VOC concentrations while 55% exhibit an apparent decreasing trend. The remaining wells either have historically only exhibited low levels of contamination (8% of the wells) or did not appear to have either a decreasing or increasing trend in concentration (25% of the wells).

Further analysis of the 40 well subset to determine if the distribution of individual VOCs has changed over the years indicates the concentrations of parent and breakdown products has remained in a relatively steady state over the years. Since this analysis was inconclusive in showing if naturally occurring degradation of the parent compounds (PCE, TCE, 1,1,1-TCA) was occurring the entire database was analyzed to determine if the relative percentages of breakdown products were increasing with time. This analysis was completed by comparing the relative percent of each individual compound to the total VOCs for the earliest availible, and latest availible sampling data. The results of this analysis were then plotted on the site base map (Figure 5-25 and 5-26) to determine if any spatial relationships are present. This analysis is further discussed in Chapter 6.

5.3.4 **Contaminant Distribution with Depth**

Groundwater sampling with depth was conducted as part of this investigation and several previous investigations. The analytical results from these sampling efforts indicate that the contaminants associated with the NCIA are vertically stratified both on-site and off-site. A series of cross sections across the major plume areas were prepared to clearly illustrate the stratified nature of the contaminants, and the plumes position in relation to the source areas and the Bowling Green supply wells. The total VOC values presented on the cross sections are from the data collected from September 1996 to the present and are representative of the current contaminant levels in the aquifer. As needed certain data points have been projected onto the cross section in areas of limited data. Cross section A-A' (Figure 5-27) runs southwest along the axis of the eastern plume downgradient through the Bowling Green supply wells. Cross section B-B' (Figure 5-28) and C-C' (Figure 5-29) also run in a southwestern direction along the axis of the central and western plumes respectively. The final cross section, D-D' (Figure 5-30), is oriented along the alignment of Old Country Road and Grand Boulevard.

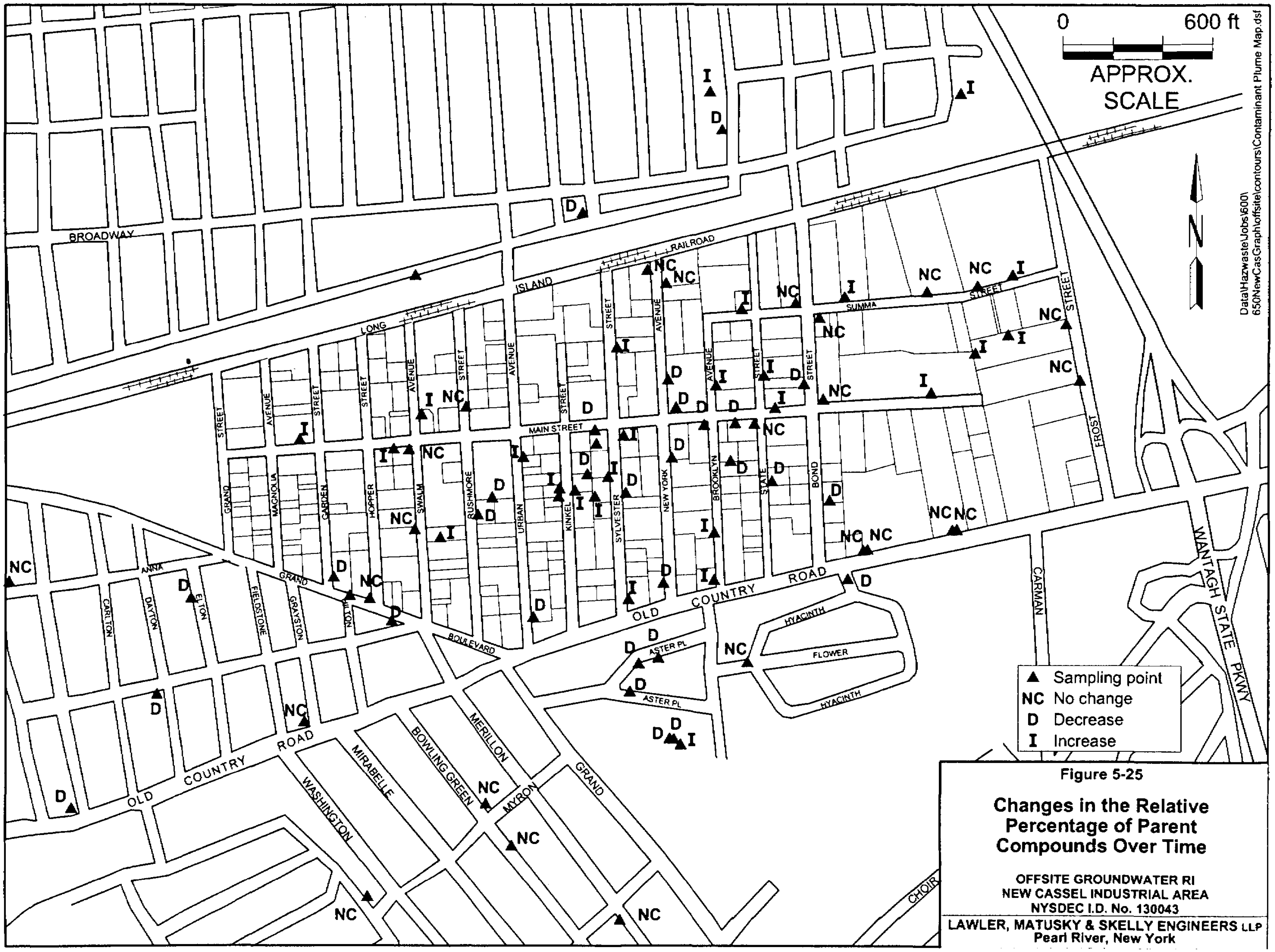

Figure 5-25

Changes in the Relative Percentage of Parent Compounds Over Time

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

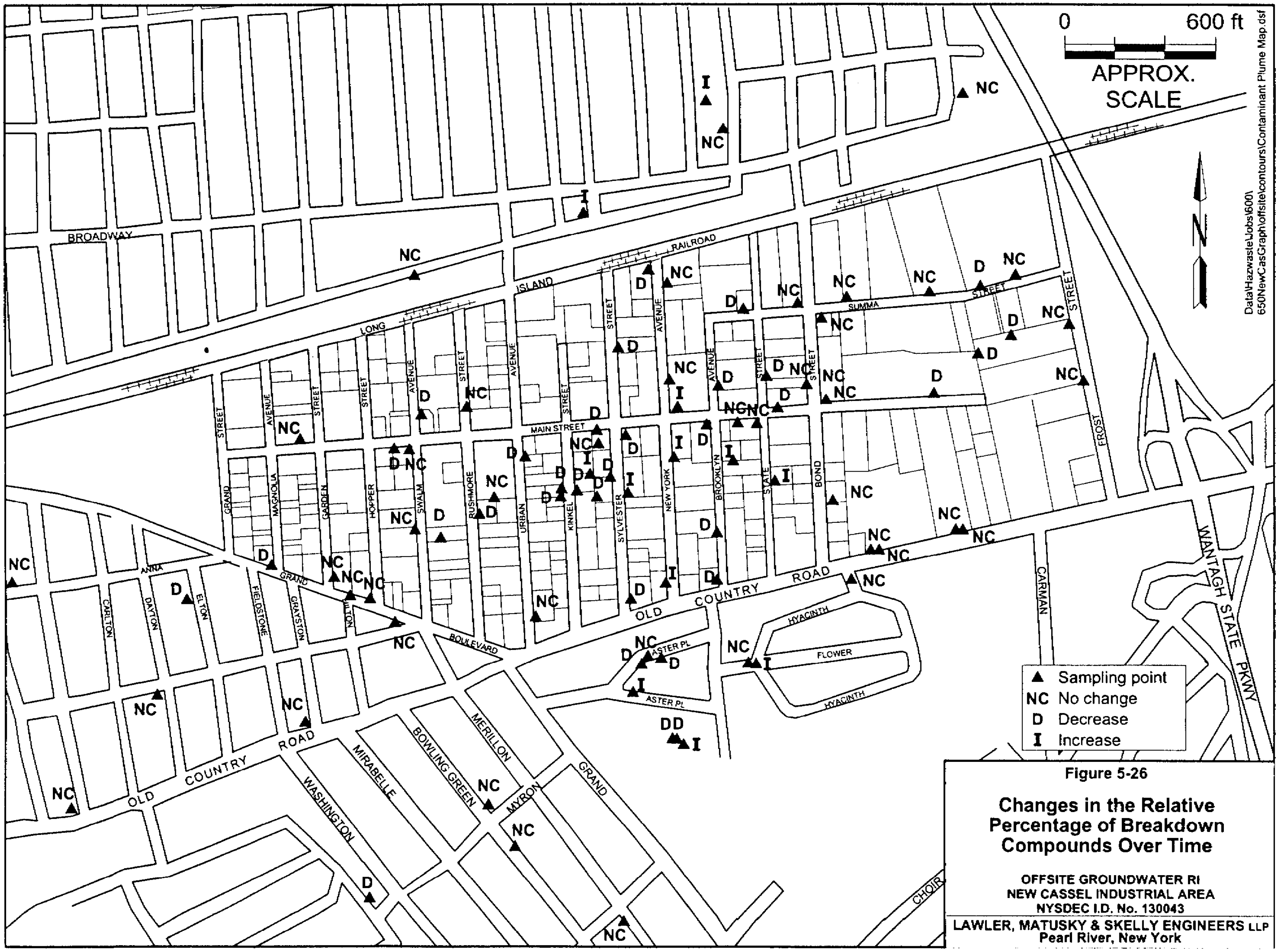

Figure 5-26

Changes in the Relative Percentage of Breakdown Compounds Over Time

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

R2-0000451

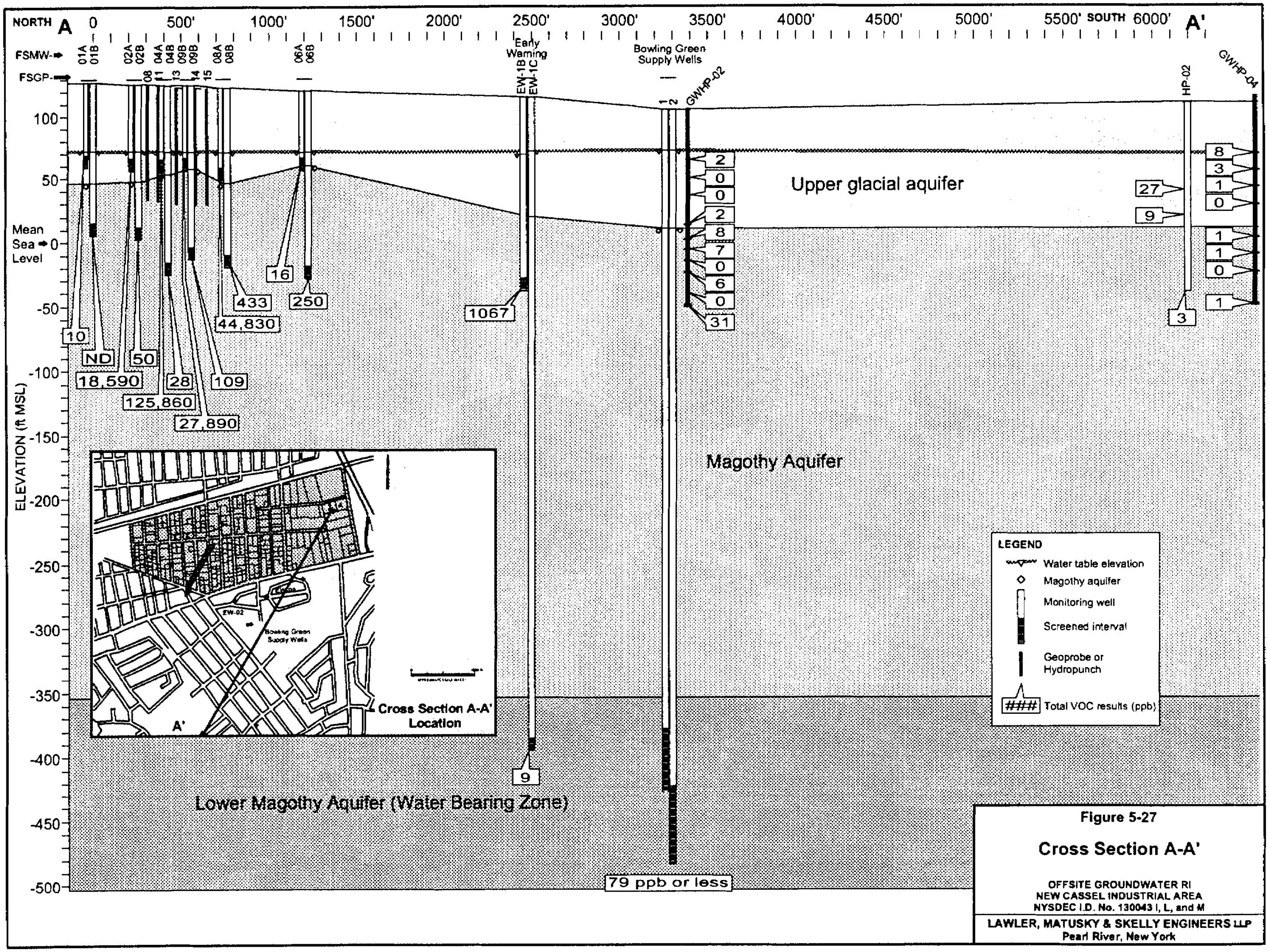

Figure 5-27

Cross Section A-A'

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043 I, L, and M

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

R2-0000452

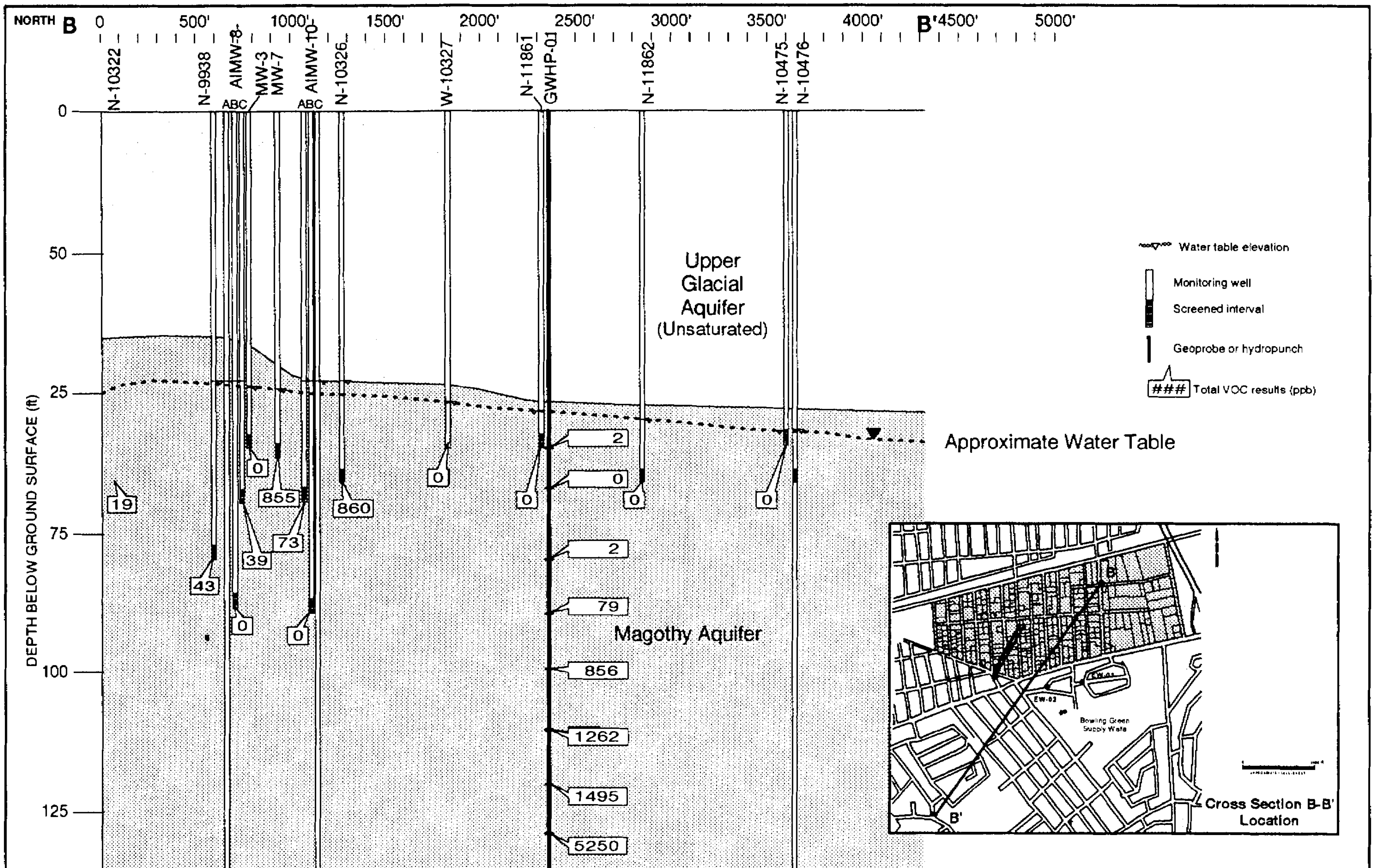

Figure 5-28

Cross Section B-B'

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043 I, L, and M

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

R2-0000453

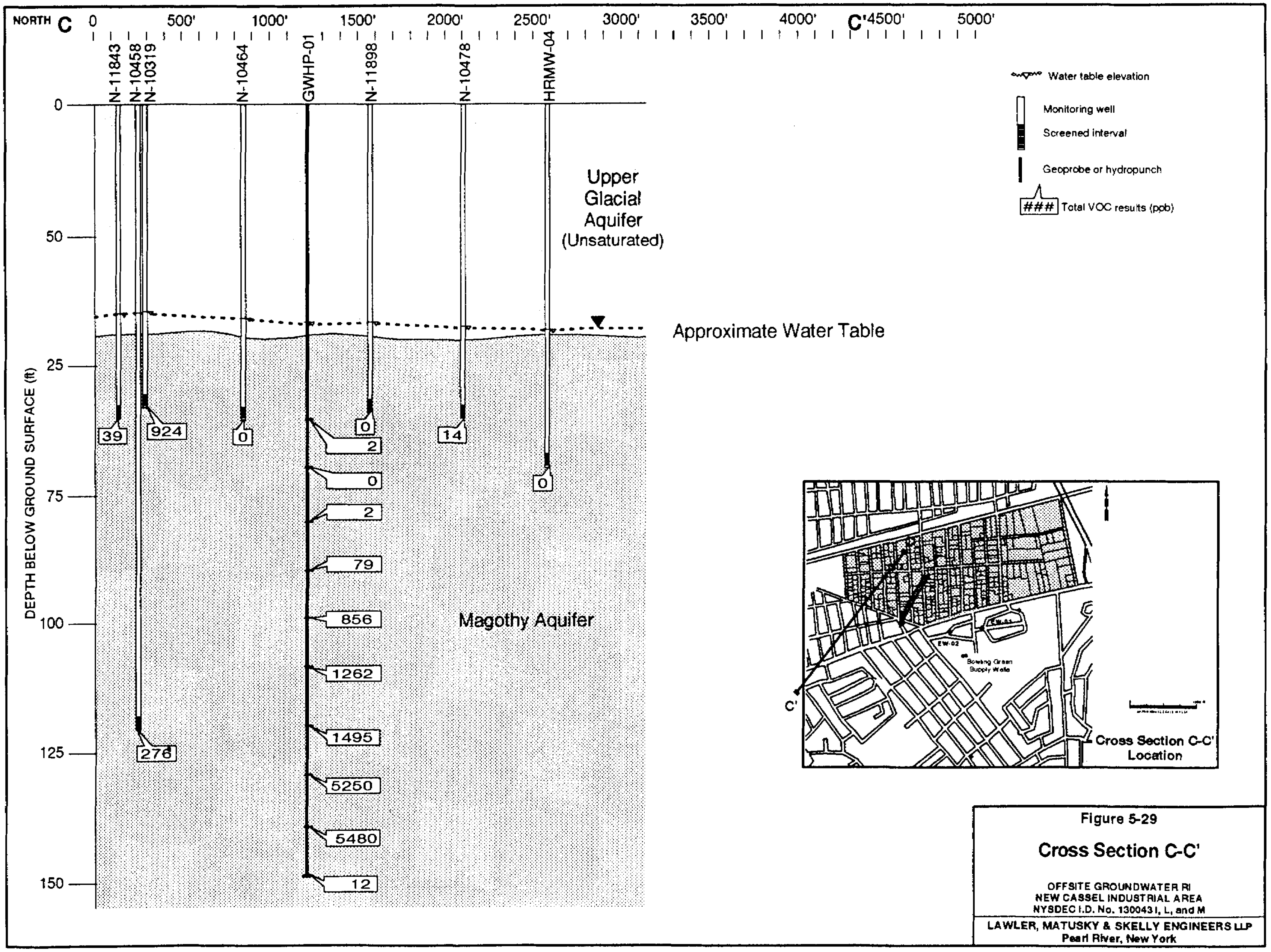

Figure 5-29

Cross Section C-C'

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043 I, L, and M

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

R2-0000454

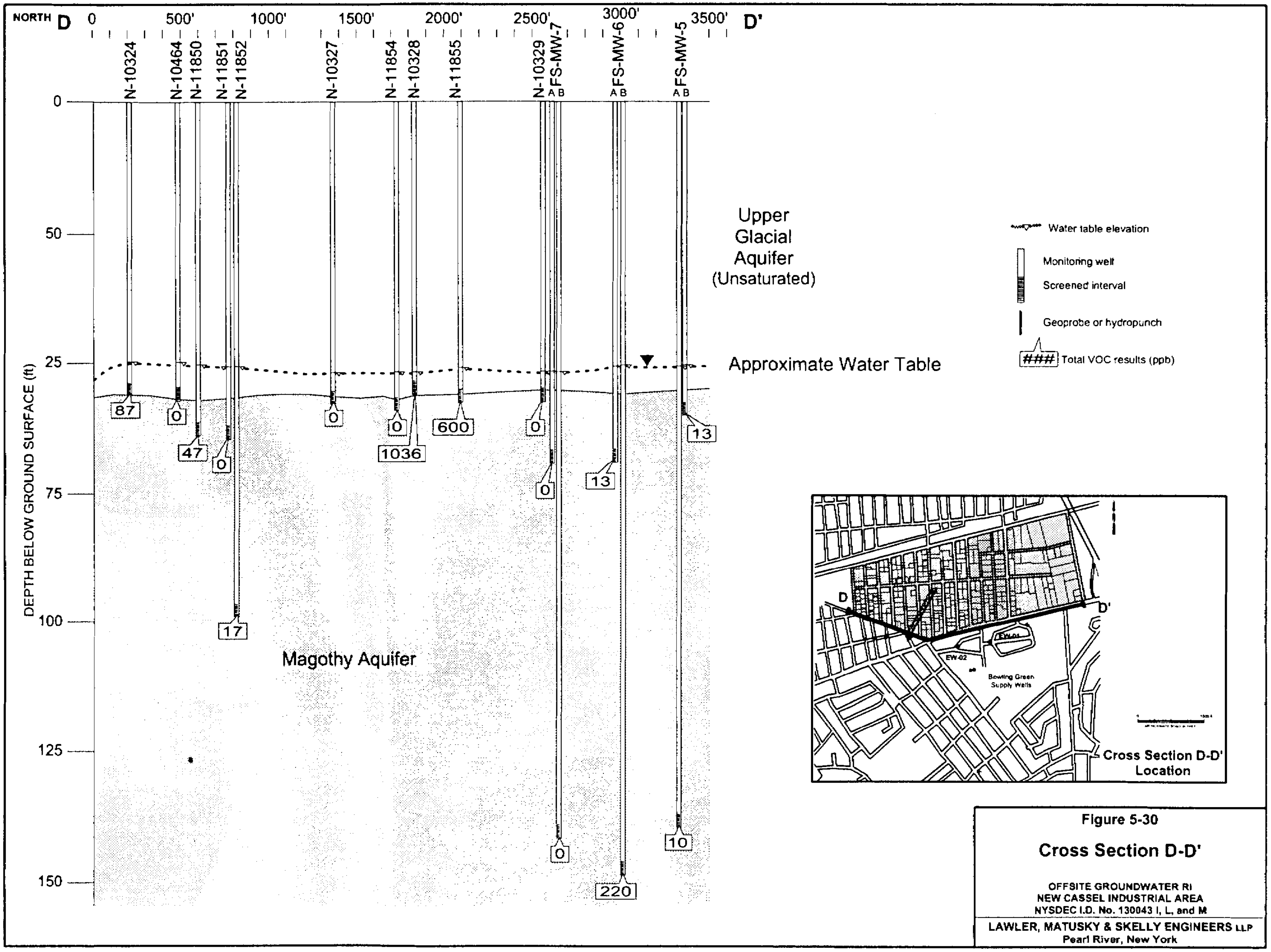

Figure 5-30

Cross Section D-D'

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043 I, L, and M

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

R2-0000455

CHAPTER 6

SUMMARY AND CONCLUSIONS

6.1 FIELD INVESTIGATION

The off-site groundwater RI for the NCIA was performed to further characterize the nature and extent of the known groundwater contamination discovered during the previous investigations associated with this site. The field investigation included two phases; the first phase of the RI included two rounds of groundwater monitoring well sampling, and the construction and sampling of 4 new shallow monitoring wells at off-site locations. The second phase of the RI included a third round of monitoring well sampling, and the completion of four hydropunch-sampling locations.

A total of 49 groundwater samples were collected from 49 monitoring wells during the first round of sampling (May 1999) including 41 existing wells, the four new shallow monitoring wells, and the four Bowling Green early warning wells. The NYSDEC contract laboratory analyzed each of these groundwater samples for VOCs.

During the second round of sampling in August 1999 a total of 49 groundwater samples were collected from same subset of wells as the first sampling round in April 1999. The NYSDEC contract laboratory also analyzed each of these groundwater samples for VOCs.

The third round of monitoring well sampling (January 2000) included a 24 well subset of the first and second round monitoring wells. Each of these wells were analyzed for VOCs and a number of other physical and chemical parameters to assist in the MNA evaluation.

A total of 39 groundwater samples were collected from four separate off-site hydropunch groundwater sampling locations. These samples were collected beginning at the watertable and continuing to a total depth of 150-ft. below the ground surface at 10-foot sampling intervals. Each of these samples were analyzed by the NYSDEC contract laboratory for VOCs.

6.2 DATA INTERPRETATION

The groundwater contamination problem associated with the NCIA was first discovered in 1985 (NCDOH 1986). Since that time several extensive sampling efforts have been conducted at the NCIA to determine the sources and extent of this contamination (Table 5-1). A major portion of the effort of this off-site groundwater RI has been to compile and interpret the historical data to determine the fate and transport of the contaminants as they relate to off-site locations.

6.2.1 Area of Historically Impacted Groundwater

The area of historically impacted groundwater is shown on Figures 5-5 to 5-8. Overall this set of figures shows the maximum area of impacted groundwater since it was prepared using the highest noted concentration of total VOCs over the years. The inferred isoconcentration contours are based on a logarithmic scale beginning a 100 µg/l and progressing through 1,000 µg/l. This contouring resulted in three individual plume areas over the three depth intervals examined with the exception of the deepest depth level (125 to 200 ft below the ground surface) where only two apparent plume areas were found.

The eastern most plume is located west of Frost Street and south of Summa Avenue with its source area centered about the Frost Street sites (#1-30-043I, M, and L) (Figure 5-5). The nature and extent of the contamination in this area has been relatively well defined during the RI at these sites and this plume area exhibits the highest concentrations associated with the NCIA (LMS 1999). The primary contaminant of concern in this plume area is PCE and it's associated breakdown products. The total VOC concentrations in the shallow groundwater in this area exceeded 10,000 µg/l at four sampling locations in the shallow groundwater, the very high concentrations suggest that DNAPL is present in this vicinity. The shallow groundwater contamination associated with this plume area extends just south of Old Country Road (Figure 5-5). The axis of the plume is generally in the direction of the flow direction found for the shallow groundwater.

The total VOC concentration increases with depth in the eastern plume and reaches it's highest concentrations at the 65 to 99 ft. interval with the highest single measurement of over 100,000 µg/l at the center of this plume area (Figure 5-6). It is believed that the extremely high concentrations noted in the area are the result of NAPL within the fine-grained matrix of the transition zone between the UGA and Magothy Aquifer. The maximum extent of this plume is slightly smaller than the noted plume in the shallow groundwater. At the deeper depth intervals (100-124 ft and 125 to 200 ft below the ground surface) the contaminant concentrations decrease on-site (north of Old Country Road) as it appears that the plume has not migrated vertically downward in this area (Figure 5-7 and 5-8). It is not known whether this is a function of the time required to migrate to this depth or whether the fine-grained nature of the material at this depth is preventing downward migration. The planned active groundwater remediation at the Frost Street sites should facilitate source removal and limit the further potential for downward migration on the site. At the deeper depths off-site, the eastern plume and the central plume are co-mingled. Generally the highest total VOC concentrations (TVOC > 1000 µg/l) are located south of Old Country Road just north of the Bowling Green wellfield. At the deeper depths the data is somewhat limited, the hydropunch data collected during the installation of the early warning wells indicate that beyond 150 feet the contaminant concentrations drop off rapidly.

The second plume area is located in the central section of the industrial area with the most highly concentrated area south of Main Street (Figure 5-5). The source area of this plume appears to be the Arkwin Industries site (#1-30-043D), and the Tishcon Corporation sites (#1-30-043V and E). The noted contamination north of Main Street is attributable to the Tishcon Corporation site (#1-30-043C) and the delisted Metpar Steel site (#1-30-043G). The former LAKA site (1-30-043K) is also located within the western portion of this plume area. In this plume area the primary contaminant of concern is 1,1,1-TCA and its breakdown products. Significant concentrations of TCE and PCE were also found at certain sampling locations especially at the deeper depths off-site. The total VOC concentrations in the shallow groundwater in this area exceeded 10,000 µg/l at three sampling locations and exceeded 1,000 µg/l at two locations in the shallow groundwater (Figure 5-5). The highest concentrations are located directly downgradient of the Tishcon Corporation site (#1-30-043E) and the very high concentrations suggest that NAPL is present in this vicinity. The high concentrations found on-site suggest that the on-site areas will continue to act as a source of contamination to the off-site groundwater. The planned active remedial measures on-site should serve to reduce the mass of contaminants available as a source for the off-site contamination. The shallow off-site groundwater contamination associated with this plume area extends south of Old Country Road to just north of the Bowling Green wellfield (Figure 5-5).

Since this plume area extends into the vicinity of the Bowling Green wellfield the contaminant distribution with depth is critical. Both of the deeper depth intervals (Figure 5-7 and 5-8) indicate that a large relatively highly concentrated plume (TVOC> 1,000 µg/l) exists south of Old Country Road. The hydropunch sampling location completed on Myron (GWHP-01) (Figure 5-4) indicates that total VOC concentrations range from 856 to 5,480 µg/l between 100 and 140 ft below the ground surface, at these depths the primary contaminant of concern is TCE and 1,1-DCE. An additional groundwater hydropunch sampling location (GWHP-02) was completed in this area. This hydropunch was located directly downgradient of the Bowling Green wells within Basin 51. This hydropunch sampling location exhibited significantly lower concentrations at the deeper depths that GWHP-01. Total VOC concentrations at this location ranged from ND to 8 µg/l between 100 and 140 ft. The highest total VOC concentration found at this location was 31 µg/l in the deepest sample that was collected. Previous sampling conducted during the installation of the Bowling Green early warning wells indicate that at the two early warning well location the total VOC concentrations tend to decrease below 150 ft below the ground surface.

The final plume area is located in the western section of the industrial area and extends from the Long Island Railroad to just south of Old Country Road (Figure 5-5). The most upgradient source area for this plume appears to be the 118-130 Swalm Street site (#1-30-043P). Several other Class 2 sites including Atlas Graphics (#1-30-043B), IMC Magnetics (1-30-043A), and 299 Main Street (1-30-043S) are also located within this plume area. The primary contaminants of concern in this plume depends on location, significant concentrations of TCE, PCE, and 1,1,1-TCA area found throughout the plume. The total VOC concentrations in the shallow groundwater in this area exceeded 1,000 µg/l at six sampling locations. Three of the six are located on the 118-130 Swalm Street site while the other three are located downgradient south of Main Street. The shallow groundwater contamination associated with this plume area extends approximately 100 feet south of Old Country Road. Between Grand Boulevard and Old Country Road the plume extends over a seven block residential area (Figure 5-5). This plume area reaches its maximum apparent extent in the shallow groundwater which may indicate that this plume is representative of more recent discharges or that the contaminants were released as dissolved product and has not vertically migrated downward.

6.2.2 **Area of Impacted Groundwater- 1998 to 2000**

The current area of impacted groundwater based on data collected from 1998 to 2000 (Figure 5-9 to 5-12) is very similar to the area of historically impacted groundwater. Three plume areas are present including the eastern, central, and western plume and they are of generally the same aerial extend and shape. In some cases the plume area have decreased in apparent size from the historically impacted area. This is caused in some cases as a result of a lack of data in certain locations and in other locations by an actual decrease in contaminant concentrations. Over all four depth ranges examined the contaminant levels are very similar during this period of time as the historically impacted area of groundwater, and the impacted groundwater areas between 1993 to 1996.

Over the various depth ranges for the eastern plume area the plume configuration is essentially the same when comparing the historically impacted area and the data collected between 1998 to 2000 over the two shallow depths (Figures 5-5 and 5-9, Figures 5-6 and 5-10). The differences at the deeper depths (Figures 5-7 and 5-11, Figures 5-8 and 5-12) are the attributable to a lack of sampling points over the particular time period of 1998 to 2000. The data collected during 1998 to 2000 is consistent with the previous data: PCE is the primary contaminant of concern both on-site and off-site. At off-site locations significant concentrations of breakdown products were also found from 1998 to 2000. As noted in the historical data the apparent source area for this contamination are the Class 2 sites in the vicinity of the Frost Street sites.

When comparing the available data for the shallow depth (0-64 ft bgs.) for the central plume during the period 1998 to the present (Figure 5-9) against the historical data (Figure 5-5) only minor differences in the plume configurations are noted. It is believed the minor differences are attributable to the limited number of sampling points available from 1998 to the present for on-site locations within the industrial area. For the depth range between 65 to 99 ft bgs significant differences are noted between the historical data (Figure 5-5) and the current data (Figure 5-9). Although a trend toward lower total VOC concentrations in the primary source area is apparent it is not known if this trend actually exists or if it is a result of limited data from 1998 to the present. For the two deeper depths of the central plume the primary differences in the present plume configuration vs. the historical plume configuration appear to be in the lower (less than 1000 μg/l) concentration fringe areas of the plume. For example the historical data indicates that the maximum extent of the 100 to 124 ft plume area should extend 300 ft downgradient of Washington Avenue while the latest RI data indicates that this plume area extends to just north of Washington Avenue. In this case it is not known whether this indicates a decrease in concentration with time or is simply a function of the available sampling data with depth.

Comparing the various plume configurations with depth for the western plume is difficult since little actual data was historically collected downgradient of the source areas for this plume. This RI focused on the potential off-site impacts from this plume and the data indicates that this plume does not appear to extend to the deeper depths at high concentrations (greater than 1000 μg/l). During the RI, hydropunch data collected at GWHP-03 located on Fieldstone Street (Figure 5-4) indicates that the highest concentration area of this plume extends from 78 to 100 ft with total VOC concentrations ranging from 123 to 315 μg/l. At the deeper depths the concentrations appear to be decreasing with the exception of 138 to 140 ft bgs (total VOCs 134 μg/l).

6.2.3 Area of Impacted Groundwater- Prior to 1993 to 2000

The previous data collected prior to 1993 (Figure 5-13 to 5-16), 1993 to 1996 (Figure 5-17 to 5-20), and 1996 to 2000 (Figure 5-21 to 5-24) provide a means of comparing this data to the current and historically impacted areas of groundwater. For the data collected from 1993 to 1996 it is important to note that the data is somewhat limited since the investigations conducted during this period were focused toward sampling the on-site groundwater at depths less than 100 ft below the ground surface. Again overall each of the plume areas at each of the shallow and intermediate depths appear to be generally of the same shape, size and magnitude of contamination. At the deepest depths the data is limited, the available data does not indicate an increasing plume size or increasing trend in contamination. Overall in comparing the various plume configurations based on the data collected over the specified years the strongest apparent trend is that the overall plume configurations have not significantly changed when the effect of limited data for specific areas is screened out.

6.2.4 Temporal Variations in Groundwater Quality in Individual Wells

The groundwater wells included in the temporal variation analysis were selected from the database based on the number of sampling events over the time period of interest. Currently the database contains groundwater quality information for 182 wells. Of the 40 wells that were included in this temporal evaluation of total VOC concentrations, 12% exhibit an apparent increasing trend in VOC concentrations while 55% exhibit an apparent decreasing trend. The remaining wells either have historically only exhibited low levels of contamination (8% of the wells) or did not appear to have either a decreasing or increasing trend in concentration (25% of the wells).

Although this analysis contains a large degree of variability and uncertainty some general conclusions can be made. Greater than 50% of the wells appear to be decreasing in concentration. It is believed the reduction in concentrations in these wells is directly related to the changes in the disposal practices once county sewers were installed in this area. After the mid-1980's most of the industrial wastewater generated in the industrial area was directed to the newly installed sewer system rather than on-site leaching pools. Thirty-seven percent of the wells continue to exhibit significant concentrations of VOCs and of these approximately half shows an apparent increase in VOC concentrations over the years. This suggests that although the concentrations of VOCs in the groundwater appear to be decreasing in a large percentage of the wells a similar percentage of the wells have not show improvement or are increasing in concentration. This conclusion indicates that an active remedial alternative will be required to meet the remedial action objectives. Of special concern are those wells that are increasing in concentration. The 12% of wells that exhibited an increasing concentration included 5 wells. Three of the 5 wells are supply wells (N-5655, N-8956, and N-8957) including the two Bowling Green production wells (N-8956 and N-8957).

The analysis of the entire database to evaluate if the distribution of individual VOCs has changed over the years is plotted on Figure 5-26 and 5-27. This analysis compares the relative percentages of each individual compound to the total VOCs for the earliest available and latest available sampling data. This analysis did not indicate that there is a definite trend to indicate that the parent compounds are naturally degrading to their breakdown products. It is expected that if naturally occurring processes were degrading the parent chlorinated compounds the relative percentages of the parent compounds would be decreasing while the relative percentages of the breakdown products would increase. This should hold especially true for the areas downgradient away from the on-site source areas.

6.2.5 **Chemical Fate and Transport**

The overall contaminant distribution is related to a number of factors that are difficult to quantify for this site. In order to describe the contaminant distribution with depth a conceptual model of contaminant fate and transport at the site was developed. In developing the a conceptual model the following characteristics of the site were considered:

- Contaminant source areas and the nature of the contaminants
- Site geology
- Site hydrogeology including the influence of the Bowling Green production wells

The source areas for the on-site groundwater and off-site groundwater contamination at the NCIA is clearly attributable to the individual facilities on the New York State Registry of Inactive Hazardous Waste Disposal Sites as Class 2 sites. Sampling conducted during this investigation and previous investigations has not identified any additional sources for this contamination, including any upgradient off-site sources. The primary contaminants of concern are compounds typically known as chlorinated solvents such as 1,1,1-TCA, PCE, and TCE. In some areas compounds associated with petroleum products such as gasoline are also found but overall the contamination is specific to chlorinated solvents and their breakdown products. These chlorinated solvents were used extensively by industry for degreasing and cleaning operations. A number of industries that used large amounts of these compounds were or still are located in the industry area. Prior to this area receiving county sewer service (early to mid-1980's) the waste products from these operations were disposed of into on-site leachpools or drywells. Much of the disposal likely occurred in the 1960's to early 1980's, industrial development in the area began in the late 1950's and the area was essentially built out for industrial and commercial uses by the late 1970's. Once placed in the leachpools or drywells the wastes migrated vertically through the unsaturated zone and eventually found their way into the groundwater.

Chlorinated solvents exhibit densities greater than water and tend to sink in their pure form when released to groundwater. The solubility of the parent chlorinated compounds are 4,400 mg/l for 1,1,1-TCA, 1,100 mg/l for TCE, and 150 mg/l for PCE. As these compounds are found in several areas of the site in excess of 10 percent of their solubility limit and it is believed that non-aqueous phase liquid (NAPL) is present in the aquifer. The areas where NAPL are likely present include the eastern plume area near the Frost Street sites, the central plume area near the Tischon sites, and the western plume near the IMC Magnetics site. In an effort to contain the continuous source of contamination associated with the NAPL at these sites the selected remedial action for the individual sites includes some type of active groundwater remediation. Although these on-site remedial measures may take many years to remove the source of contamination it is believed they will significantly reduce the mass of contaminants leaving the industrial area.

The geology at the site consists of a thick sequence of stratified unconsolidated sands, silts, and gravels. Only the deeper basal portion of the Magothy Formation is currently used as a source of raw public drinking water. The remainder of the formation owing to its stratified nature with many fine-grained zones tends to confine the lower portion of the formation. The other important feature of the geology at the site that influences the contaminant fate and transport is the relationship between the watertable and the transition zone between the upper glacial sands and gravels and the Magothy Formation. It is believed that across many areas of the site the watertable is found within the transition zone and the upper glacial sands are unsaturated. This provides a mechanism for the contaminants to enter the upper zones of the Magothy Formation rather than being quickly transported horizontally in the much coarser upper glacial sands and gravels.

The site hydrogeology is typical of this area of Long Island, the groundwater flow direction in this area is to the southwest (Figure 6-1, LMS 1999, LMS 1997, LMS 1996) under a gentle gradient. This results in groundwater flow velocities ranging from .5 ft/day in the coarse-grained sands and gravels in the UGA to 0.1 ft/day in the upper portion of the Magothy Aquifer. The presence of the Bowling Green supply wells also produces a significant downward vertical gradient in the vicinity of the NCIA. The Bowling Green Estates Water District uses two production wells (Well #1 and Well #2) located south of Old Country Road. Both wells were installed in 1975 and are completed in the basal water-bearing portion of the Magothy Aquifer. Each well has a permitted capacity of 1400 gpm. Well #1 is 532.5 ft deep with a screened zone from 478 to 527.5 ft. Well #2 is 583.5 ft deep with a screened zone from 524 ft to 583.5 ft. An air stripper and carbon filters currently treat the well water; its average pumping rate is approximately 1200 gpm, with one well pumped at a time. The resultant drawdown near the wellhead during pumping is reported to be approximately 50 feet. This results in vertically downward gradient of .1 ft/ft at the wellhead that is several orders of magnitude greater than the horizontal gradient. Radially outward from the well the drawdown decreases which

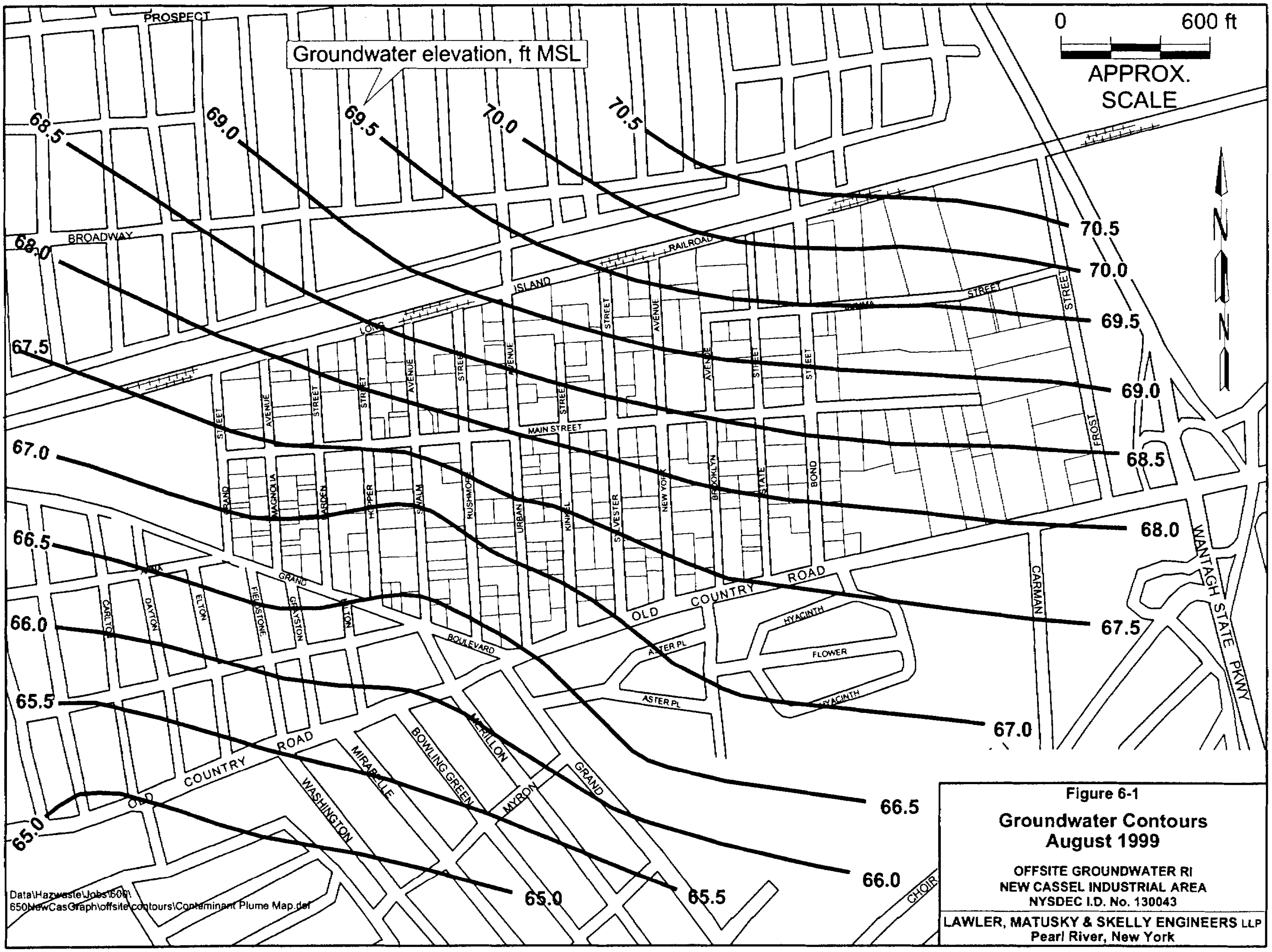
Figure 6-1
Groundwater Contours
August 1999
OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043
LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York
Groundwater elevation, ft MSL
0
600 ft
APPROX.
SCALE
N
70.5
70.0
69.5
69.0
68.5
68.0
67.5
67.0
66.5
66.0
65.5
65.0
PROSPECT
BROADWAY
LONG ISLAND RAILROAD
MAIN STREET
OLD COUNTRY ROAD
GRAND BOULEVARD
WANTAGH STATE PKWY
CARMAN
FROST STREET
HYACINTH
FLOWER
ASTER PL
WASHINGTON
MIRABELLE
BOWLING GREEN
MERILLON
MYRON
GRAND
CHOIR
Data\Hazwaste\Jobs\600\
650NewCasGraph\offsite contours\Contaminant Plume Map.def

R2-0000465

would tend to lower the vertical gradient. The aerial extent of the drawdown (cone of depression) caused by the Bowling Green wells likely extends under most of the eastern and central plumes. The lower values in head within the cone of depression create a significant downward vertical gradient across the confining sands, silts and clays found between the 150 and 450 foot level. This portion of the formation would appear to be the only limiting factor in preventing the migration of the contaminants to the supply wells. Due to its deep depth, the data available to describe this portion of the formation is limited. Based on the four borings which have penetrated to the basal section of the formation (the two supply wells and the two deep early warning wells) it appears that some of the clay layers are relatively thick and continuous in the vicinity of the supply wells. It is believed the hydraulic conductivity of the formation between 150 ft and 450 ft is generally low. However, it is not known if zones of higher permeability might serve as downward conduits for the contamination.

6.3 POTENTIAL EXPOSURE PATHWAYS

Currently there are no existing pathways of exposure to the groundwater within the NCIA since the groundwater is not utilized in any capacity, including as a source of drinking water. The potential for off-site exposure pathways downgradient of the NCIA through the groundwater will be addressed as part of Task 7 of this assignment and full described within the FS report (Chapter 8).

6.4 REMEDIAL ACTION OBJECTIVES

Remedial action objectives are developed for a site to determine the levels to which contaminant concentrations must be reduced to protect human health and environment. The remedial action levels for this site are based on established NYSDEC Class GA groundwater standards for each of the contaminants of concern.

NEW YORK STATE SUPERFUND CONTRACT

New Cassel Industrial Area
Offsite Groundwater
Town of North Hempstead, Nassau County

Remedial Investigation/ Feasibility Study (RI/FS) Report

Volume II • Feasibility Study Report

Work Assignment No. D002676-42.1

September 2000

Prepared for:

New York State Department of Environmental Conservation

50 Wolf Road, Albany, New York 12233
John Cahill, *Commissioner*

Division of Environmental Remediation
Michael J. O'Toole, Jr., *Director*

By:

Lawler, Matusky & Skelly Engineers LLP

R2-0000467

ENGINEERING AND OPERATIONS SERVICES
NEW YORK STATE SUPERFUND STANDBY CONTRACT

NEW CASSEL INDUSTRIAL AREA
OFF-SITE GROUNDWATER
TOWN OF NORTH HEMPSTEAD, NASSAU COUNTY

Work Assignment No. D002676-42.1

FEASIBILITY STUDY REPORT

Prepared for:

New York State Department of Environmental Conservation
Division of Environmental Remediation

September 2000

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Pearl River, New York 10965

Project No. 650-428

R2-0000468

CHAPTER 7

APPLICABLE STANDARDS, CRITERIA, AND GUIDANCE

7.1 INTRODUCTION

This chapter identifies applicable standards, criteria, and guidance that are used in the development of the health exposure pathway analysis (Chapter 8) and the feasibility study (Chapters 9 through 12) for the NCIA off-site groundwater. Applicable requirements are defined as those promulgated Federal or state requirements (e.g., drinking water standards or standards of control) that specifically address a hazardous substance, pollutant, or contaminant found at a Federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) site. Relevant and appropriate requirements are those Federal, state, or local requirements that, while not directly applicable, address items that are sufficiently similar to those encountered at CERCLA sites. Collectively, these terms are commonly referred to as applicable or relevant and appropriate requirements, or ARARs. In addition to ARARs, other criteria, advisories, or guidance may apply to the conditions found at a site; these are referred to as to-be-considered (TBC) items. TBCs are not legally binding but may be useful in evaluating site risks and determining site cleanup goals.

In the New York State regulations (6 NYCRR Part 375), the equivalent term for "ARARs" is "standards and criteria" and the equivalent term for "TBCs" is "guidance". Within New York State regulations, these terms are grouped together and referred to as "standards, criteria, and guidance" or SCGs.

SCGs are generally divided into three item-specific categories: chemical, location, and action. Chemical-specific SCGs provide guidance on acceptable or permissible contaminant concentrations in environmental media such as soil, air, and water. Location-specific SCGs govern activities in critical environments such as floodplains, potable source aquifers, wetlands, endangered species habitats, or historically significant areas. Action-specific SCGs are technology- or activity-based requirements. The SCGs described in this chapter are of possible importance to the health exposure pathway analysis and to the FS.

Some SCGs establish numerical values to limit the discharge or ambient concentration for a particular contaminant. In order to determine if a condition or activity complies with applicable SCGs, a list of specific contaminants of concern (COCs) is organized based on site-specific environmental data. For the NCIA off-site groundwater, the list of COCs includes those contaminants that are present in significant concentrations in groundwater, as identified in the RI and determined in the health exposure pathway analysis (Chapter 8). The list includes PCE, TCE, 1,1,1-TCA, 1,1-DCE, 1,2-DCE, 1,1-DCA, 1,2-DCA, and vinyl chloride. The SCGs for these COCs are summarized in Table 7-1 and discussed below.

7.2 CHEMICAL SPECIFIC SCGs

7.2.1 New York State Groundwater Standards

For this FS, the NCIA "site" is defined as the properties bounded by the Long Island Railroad to the north, Old Country Road to the south, Grand Boulevard and Grand Street to the west, and Frost Street to the east. Groundwater contamination from the NCIA extends south and southwest in the direction of groundwater flow. This FS addresses the off-site groundwater, or the portions of the VOC contaminant plumes that are south of Old Country Road and Grand Boulevard. Aquifers underlying the FS focus area (i.e., off-site groundwater) are each designated as a "Class GA" groundwater, which is defined by the New York State Groundwater Standards to be as follows: "The best usage of Class GA waters is as a source of potable water supply. Class GA waters are fresh groundwaters found in the saturated zone of unconsolidated deposits and consolidated rock or bedrock." Therefore, the Class GA groundwater standards are intended for protection of human health where groundwater is used as a drinking water supply. Numerical groundwater standards and guidance values are presented in 6 New York Code of Rules and Regulations (NYCRR) Part 703 and NYSDEC's Division of Water (DOW) Technical and Operational Guidance Series (TOGS) 1.1.1 titled "Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations" (NYSDEC 1998). The Class GA groundwater standards are equivalent to criteria established by the New York State Department of Health (NYSDOH) for public water supplies. The NYSDOH criteria were promulgated in NYCRR Title 10 Chapter I (State Sanitary Code) Subpart 5-1. The New York State standards are equivalent to, or are more stringent than, Federal maximum contaminant levels (MCLs) established by the United States Environmental Protection Agency (USEPA). For the off-site groundwater,

TABLE 7-1

STANDARDS, CRITERIA, AND GUIDANCE VALUES

New Cassel Industrial Area Off-site Groundwater

	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	1,1,1-TCA	1,1-DCE	1,1-DCA	1,2-DCA	VC
NYS Groundwater Standards - Class GA (µg/l) (a)	5 **	5 **	5 **	5 **	5 **	5 **	5 **	0.6	2
NYS Groundwater Effluent Limitations (µg/l) (a)	5	5	5	5	5	5	5	0.6	2
NYS Recommended Soil Cleanup Objectives (mg/kg) (b)	1.4	0.7	0.3	0.3	0.8	0.4	0.2	0.1	0.2
US EPA Drinking Water Standards - MCLG/MCL (mg/l) (c)	0/0.005	0/0.005	0.07/0.07	0.1/0.1	0.2/0.2	0.007/0.007	NA/NA	0/0.005	0/0.002
US EPA Drinking Water Health Advisory [1] (mg/l) (c)	NA	NA	0.07	0.1	0.2	0.007	NA	NA	NA
US EPA Ambient Water Quality Criteria (µg/l) (d)	0.8 [2]/8.85 [3]	2.7 [2]/81 [3]	NA/NA	NA/NA	NA/NA	0.057 [2]/3.2 [3]	NA/NA	0.38 [2]/99 [3]	2 [2]/525 [3]
National Ambient Air Quality Standards (µg/m³)	NA	NA	NA	NA	NA	NA	NA	NA	NA
NYS Air Guide 1 (SGC) (µg/m³) (e)	81000	33000	190000	190000*	450000	2000	190000	950	1300
NYS Air Guide 1 (AGC) (µg/m³) (e)	0.075	0.45	1,900	360	1,000	0.02	500	0.039	0.020
OSHA - PEL (ppm)	100	100	200*	200*	350	none	100	50	1
NIOSH - REL (ppm)	Ca	Ca	200*	200*	350 C	Ca	100	1 Ca	Ca
NIOSH - IDLH (ppm)	150 Ca	1000 Ca	1000*	1000*	700	Ca	3000	50 Ca	Ca
ACGIH - TLV (ppm)	25 A3 BEI	50 A5 BEI	200*	200*	350 A4 BEI	5 A4	100 A4	10 A4	1 A1

(a) - NYSDEC Division of Water Technical and Operational Guidance Series (1.1.1), June 1998.
(b) - NYSDEC Technical Administrative Guidance Memorandum 40-46, January 1994.
(c) - Source was http://www.epa.gov/OST/Tools/dwstds.html, revised 4 February 1999.
(d) - 40 Code of Federal Regulations 131.36, August 1995.
(e) - NYSDEC Guidelines For The Control of Toxic Ambient Air Contaminants, 1991.
1 - Exposure over a lifetime.
2 - For consumption of water & organisms.
3 - For consumption of organisms only.
* - Value is for 1,2-Dichloroethylene (total).
** - The principal organic contaminant standard of 5 ug/L applies to this substance (6 NYCRR 700.1)
A1 - Confirmed human carcinogen.
A2 - Suspected human carcinogen.
A3 - Animal carcinogen.
A4 - Not classifiable as a human carcinogen.
A5 - Not suspected as a human carcinogen.
ACGIH - American Conference of Governmental Industrial Hygienists.
AGC - Annual Guideline Concentratoins
BEI - Biological Exposure Indices
C - Ceiling limit.
Ca - Potential carcinogen.
GV - Guidance value.
IDLH - Immediately dangerous to life of health.
MDL - Method Detection Limit
NA - Not available.
NIOSH - National Institute for Occupational Safety and Health.
OSHA - Occupational Safety and Health Association
PEL - Permissible exposure limits.
REL - Recommended exposure limits.
SB - Site Background
SGC - Short-term Guideline Concentrations
TLV - Threshold limit value

PCE - Tetrachloroethylene
TCE - Trichloroethylene
1,2-DCE - 1,2-Dichloroethylene
1,1,1-TCA - 1,1,1-Trichloroethane
1,1-DCE - 1,1-Dichloroethylene
1,1-DCA - 1,1-Dichloroethane
1,2-DCA - 1,2-Dichloroethane
VC - Vinyl Chloride

these standards may be used to determine remedial action objectives and/or treatment objectives for effluent waters (i.e., from a groundwater remediation system). Table 7-1 summarizes the standards that apply to the groundwater medium for the COCs.

Discharges to a local injection system (i.e., leaching pools or injection wells) may require a permit or permit equivalent under the State Pollution Discharge Elimination System (SPDES). SPDES permit requirements are presented in 6 NYCRR Part 750.

According to the Nassau County Department of Health (NCDOH), any discharge to a public stormwater system must meet the groundwater standards. A public stormwater collection system in the vicinity of the NCIA off-site area discharges to a retention basin and local sumps where stormwater is recharged to the underlying aquifer. Any discharges to this stormwater recharge system must then meet applicable groundwater criteria.

7.2.2 **New York State Groundwater Effluent Limitations (Class GA)**

The NYSDEC DOW regulates point source discharges to Class GA groundwater primarily through the use of effluent limitations that have been established statewide. The effluent limitations are set at concentrations that should prevent contaminants from causing an exceedance of the New York State ambient groundwater standards and guidance values. These numerical values are also presented in NYSDEC's TOGS 1.1.1 (NYSDEC 1998) and summarized in Table 7-1.

7.2.3 **U.S. Environmental Protection Agency (USEPA) Drinking Water Standards**

These federal standards include National Primary Drinking Water Standards (40 Code of Federal Regulations (CFR) Part 141) promulgated under the authority of the Safe Drinking Water Act (SDWA) for the regulation of contaminants in all surface or groundwaters utilized as potable water supplies. The primary standards include both MCLs and Maximum Contaminant Level Goals (MCLGs). MCLs are enforceable standards for specific contaminants based on human health factors, and the technical and economic feasibility of removing the contaminants from the water supply. MCLGs are nonenforceable standards that do not consider the feasibility of contaminant removal. The SDWA also provides for secondary MCLs (40 CFR Part 143) that are nonenforceable guidelines for those contaminants that may adversely affect the aesthetic quality of drinking water, such as taste, color, and odor. The constituents addressed in the SDWA are also addressed in the New York State Groundwater Standards. Table 7-1 summarizes the drinking water standards for the off-site groundwater COCs.

7.2.4 USEPA Drinking Water Health Advisories

USEPA Drinking Water Health Advisories are nonenforceable guidelines developed by the USEPA for chemicals that may be encountered in drinking water. USEPA has prepared short-term (1- to 10-day) and long-term (several years to lifetime) health advisories for subchronic effects of contaminants. A drinking water equivalent level (DWEL) is calculated as a lifetime health advisory based on a 2-liter/day water consumption rate for an adult weighing 70-kg. The DWEL is an appropriate guideline for evaluation of contaminant levels in a potable water supply. Table 7-1 presents the applicable DWELs for the NCIA off-site groundwater.

7.2.5 Federal Ambient Water Quality Criteria

In accordance with Section 304(a) of the Clean Water Act, EPA has developed the Federal Ambient Water Quality Criteria (AWQC) for priority toxic pollutants. AWQCs are not legally enforceable, but may be referenced by states when developing enforceable water quality standards. AWQCs are available for both the protection of human health from exposure to contaminants in drinking water and for the protection of aquatic life. Table 7-1 summarizes the criteria applicable to the COCs identified in the NCIA off-site groundwater.

7.2.6 Sewage Discharge Pretreatment Standards

Federal regulations (40 CFR Part 403) require sewer districts to establish and enforce pretreatment standards for the users of their sewer system. A user is prohibited from discharging waste to the sewer that contains contaminants that exceed the pretreatment standards. The user must treat the waste to meet the pretreatment standards prior to discharging it to the sewer. Pretreatment standards vary by municipality. Since effluent from a remediation system (e.g., treated groundwater) cannot be discharged to the Nassau County Department of Public Works sewer system, sewage pretreatment standards are relevant only to such discharges as small quantities from a pilot study.

7.2.7 **New York State Recommended Soil Cleanup Objectives**

The New York State recommended soil cleanup objectives have been prepared by NYSDEC in a revised Technical and Administrative Guidance Memorandum (TAGM #4046) issued in November 1994 (NYSDEC 1994). This guidance document outlines the basis and procedure for determining soil cleanup levels at state Superfund sites. Soil cleanup objectives are based on the protection of human health and groundwater quality and are dependent on the total organic carbon (TOC) content of site soils. TAGM #4046 also includes ranges of metals concentrations in native soils of the eastern United States. For the off-site groundwater area, remedial action objectives for soils will be considered only if a groundwater remediation technology can transfer contaminants to overburden soils. These soil objectives are summarized in Table 7-1.

7.2.8 **HEAST and IRIS Tables**

EPA's Health Effects Assessment Summary Tables (HEAST) and Integrated Risk Information System (IRIS) contain information used in risk assessment calculations, specifically in establishing the health risk of carcinogenic and noncarcinogenic chemicals. The most recent publications are available on the Internet.

7.2.9 **Clean Air Act**

The Clean Air Act (CAA) was passed in 1977 and governs air emissions resulting from remedial actions at CERCLA sites. National Ambient Air Quality Standards (NAAQS), presented in 40 CFR Part 50, have been promulgated under the CAA for six criteria pollutants, including airborne particulate matter. No specific CAA standards have been promulgated for the off-site groundwater COCs. The CAA is considered a relevant SCG for the NCIA off-site groundwater only to the extent that remedial actions (e.g., groundwater treatment processes) undertaken emit constituents that are regulated by the CAA. The standards for the COCs are summarized in Table 7-1.

7.2.10 **New York State Air Guide One**

The NYS Air Guide One (AG-1) provides guidance for the control of toxic ambient air contaminants in New York State. The guidelines outlined in this document are applicable to both chemical contaminants directly addressed by Federal or New York State (NYS) regulations and those for which no Federal or state ambient air quality standards exist. These guidelines are primarily intended for use in conjunction with the permitting authority and regulations found in 6 NYCRR Parts 200, 201, 212, and 257. If treatment processes for the off-site groundwater contamination cause an air emission, the activity must comply with the AG-1 guidelines. Table 7-1 lists the short-term and annual guideline concentrations (SGCs and AGCs) for the off-site groundwater COCs.

7.2.11 **Occupational Safety and Health Administration**

The Occupational Safety and Health Administration (OSHA) has promulgated permissible exposure limits (PELs) for a variety of contaminants in air (29 CFR 1910, Subpart Z). The PELs are based on time-weighted average (TWA) concentrations to which workers may be exposed over an 8-hr exposure period without adverse effects. PELs and TWAs are intended for adult workers exposed in an occupational setting, and are not directly applicable to CERCLA (see Section 7.4.1) or NYS inactive hazardous waste disposal sites. The PELs and TWAs may be used as guidance values to determine whether long-term exposures to contaminants in air during remediation activities may pose a health risk to workers. Table 7-1 summarizes the OSHA PELs for the COCs.

7.2.12 **National Institute for Occupational Safety and Health**

The National Institute for Occupational Safety and Health (NIOSH) has developed concentrations for contaminants in air that are immediately dangerous to life or health (IDLH) for individuals in occupational settings. The IDLH is the maximum concentration, in the event of respirator failure, that could be tolerated for 30-min without experiencing any escape-impairing or irreversible health effects. The IDLHs are appropriate only for subchronic exposures to noncarcinogenic compounds or effects of compounds in air. These values are not directly applicable to CERCLA (see Section 7.4.1); however, they may provide guidance concerning the upper bound of safe inhalation exposures to contaminants for on-site workers during remediation. NIOSH also has established recommended exposure limits (RELs) for several contaminants. An REL is generally a time-weighted average based on toxicological and industrial hygiene data. Applicable NIOSH IDLHs and RELs are presented in Table 7-1.

7.2.13 American Conference of Governmental Industrial Hygienists

The American Conference of Governmental Industrial Hygienists (ACGIH) has developed threshold limit values (TLVs) for contaminants in air that are updated annually. The TLV is a time-weighted average concentration under which most people can work consistently for 8 hours per day, over time, and receive no harmful effects. These values should be considered when developing a remediation plan to protect workers during remediation activities. Table 7-1 summarizes the TLVs for the off-site groundwater COCs.

7.3 LOCATION SPECIFIC SCGs

7.3.1 Well Usage Permit

6 NYCRR Part 602 requires that any well installed in Kings, Queens, Nassau, or Suffolk Counties to withdraw water for any purpose other than a public water supply must have a permit if the total capacity of such a well or wells on any one property is in excess of 45 gallons per minute (64,800 gallons per day). This regulation encompasses temporary and permanent dewatering wells. If a remediation alternative is selected that includes groundwater extraction, a permit may need to be obtained to satisfy this regulation.

7.3.2 New York State Protection of Sole Source Aquifer

6 NYCRR Part 370 defines a sole source aquifer as being the principal drinking water source for an area. If contamination were to occur in such a sole source aquifer, it would pose a significant hazard to the health of the public. The Long Island Aquifer System is among those specific sole source aquifers that are listed. This system includes aquifers underlying the counties of Kings, Queens, Nassau, and Suffolk in New York State. Certain remediation activities may be restricted due to the sole source aquifer designation.

7.3.3 Federal Protection of Sole Source Aquifer

The Code of Federal Regulations (40 CFR Part 149) describes the criteria for identifying critical aquifer protection areas pursuant to Section 1427 of the SDWA. Subpart 149.3 includes criteria that define a sole source aquifer and states that programs to reduce or prevent the contamination of sole source aquifers must be implemented when it is reasonably likely that contamination of such aquifers will occur. Certain remediation activities may be restricted due to the sole source aquifer designation.

7.3.4 Article IV of the Nassau County Public Health Ordinance

The intent of Article IV is to prohibit the installation of a private water system in those areas served by a public water system. The NCIA and its surrounding properties are serviced by a public water system, therefore this ordinance prohibits the installation of a new private water system to provide drinking water. For purposes of the exposure pathway analysis (Chapter 8) and the FS (Chapters 9 through 12), and as requested by NYSDEC, it is herein assumed that no private wells exist in areas affected by the NCIA off-site groundwater contamination.

7.4 ACTION SPECIFIC SCGs

7.4.1 Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 was amended by the Superfund Amendment and Reauthorization Act (SARA) of 1986. CERCLA, specifically Section 121 (42 USC Part 9621, Cleanup Standards), states that the selected remedial alternative must attain a cleanup level that is protective of human health and the environment, cost effective, and utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. The extent to which each of the remedial alternatives considered complies with this requirement will be assessed during the detailed evaluation of alternatives (Chapter 12 of FS).

7.4.2 Resource Conservation and Recovery Act (RCRA) and New York State Hazardous Waste Regulations

The selected remedial alternative(s) may include activities that require the generation, storage, treatment, transport, and/or disposal of hazardous waste. A waste can be identified as hazardous under two categories: 1) a waste is a "listed" hazardous waste if it is specifically listed in 40 CFR Part 261 or 6 NYCRR Part 371, or 2) a waste is a "characteristically" hazardous waste if it exhibits the characteristic of ignitability, corrosivity, reactivity, or toxicity as defined in 40 CFR Part 261 or 6 NYCRR Part 371. Handling of waste soil or groundwater that is determined to be "hazardous" must be performed in accordance with the federal hazardous waste regulations (40 CFR Parts 260-268) promulgated under the Resource Conservation and Recovery Act (RCRA), as well as New York State hazardous waste regulations (6 NYCRR Parts 364 and 370-376).

At the NCIA off-site areas, soil and groundwater that are removed as part of remediation may be considered to be listed hazardous wastes (i.e., containing spent halogenated solvents, as per 40 CFR Part 261, Subpart D). Soil and groundwater that are removed from the ground may be considered to be characteristically hazardous based on the constituent concentrations found in representative samples. If concentrations in samples exceed the regulatory level for the toxicity characteristic (TC) limit, the waste is considered a characteristically hazardous waste and must be treated or disposed of as such. Table 7-2 summarizes some of the EPA classifications and regulatory levels for hazardous wastes that may be generated in the off-site area during the remedial action phase.

Federal and state land disposal restrictions (LDRs) (40 CFR Part 268 and 6 NYCRR Part 376, respectively) identify hazardous wastes that are restricted from land disposal. A hazardous waste may be land disposed only if its constituent concentrations or an extract of the waste does not exceed regulatory constituent concentrations. Hazardous wastes containing halogenated organic compounds (HOCs) in concentrations greater than or equal to 1,000 ppm are restricted from land disposal. However, a hazardous waste may be treated to reduce its constituent concentrations below the regulatory LDR limits and subsequently be land disposed. If a soil is found to be characteristically hazardous by exceeding the TC limit, it must be disposed of at an approved hazardous waste facility or treated on-site. If treatment or facility standards are achieved, the soil is no longer subject to hazardous waste requirements and can be land disposed at a non-hazardous off-site facility.

Contaminated groundwater that is pumped to the surface is subject to similar regulations if it is found to be characteristically hazardous during the remedial action. As with soil, groundwater that exhibits the TC is subject to the same treatment standards as the characteristic waste with which it is contaminated. Groundwater containing 1,000 ppm or greater HOCs is prohibited from land disposal. If treatment standards are met, the groundwater can be discharged on land. Transportation of hazardous wastes must be

TABLE 7-2

MAXIMUM TOXICITY CHARACTERISTIC CONCENTRATIONS

New Cassel Industrial Area Off-site Groundwater

EPA Hazardous Waste Number	Contaminant	RCRA Hazardous Waste Criteria * (mg/l)
D028	1,2-Dichloroethane	0.5
D029	1,1-Dichloroethylene	0.7
D039	Tetrachloroethylene	0.7
D040	Trichloroethylene	0.5
D043	Vinyl chloride	0.2

* - 40 CFR part 261, subpart C.

conducted in accordance with all applicable regulations, including 40 CFR Part 263 and 6 NYCRR Part 372.

7.4.3 **State Pollution Discharge Elimination System**

New York State regulations (6 NYCRR Parts 750-758) prohibit discharge of any pollutant to a water body, including groundwater, without first meeting the state pollutant discharge elimination system (SPDES) requirements. NYSDEC typically requires periodic sampling to demonstrate satisfactory compliance with the SPDES discharge standards. For the NCIA off-site groundwater, achieving SPDES requirements and periodic sampling would be necessary if a remediation system produced a liquid waste stream that required disposal to groundwater or the local stormwater collection system.

7.4.4 **Underground Injection Control**

EPA's Underground Injection Control (UIC) Program under the SDWA regulates discharges to the subsurface to protect underground sources of drinking water from contamination. A remediation alternative containing a discharge component must comply with 40 CFR Parts 124, 144, 145, and 146, which describe the regulatory requirements of EPA's UIC program. Requirements include permitting and limitations on contaminant concentrations.

7.4.5 **EPA Presumptive Remedies**

Since Superfund's inception in 1980, the remedial and removal programs have found that certain categories of sites have similar characteristics, such as types of contaminants present, types of disposal practices, or how environmental media are affected. Based on information acquired from evaluating and cleaning up these sites, the Superfund program is undertaking an initiative to develop presumptive remedies to accelerate future cleanups at these types of sites. Presumptive remedies are preferred technologies for common categories of sites, based on historical patterns of remedy selection and EPA's scientific and engineering evaluation of performance data on technology implementation. The objective of the presumptive remedies initiative is to use the program's past experience to streamline site investigation and speed up selection of cleanup actions.

For the NCIA off-site groundwater, the EPA presumptive remedy titled "Presumptive Response Strategy and Ex-situ Treatment Technologies for Contaminated Groundwater at CERCLA Sites" (EPA 1996), which identifies presumptive technologies for the ex-situ treatment component of a groundwater remedy that are expected to be used for sites where extraction and treatment is part of the remedy, should be considered in formulating and selecting remediation alternatives. For treatment of dissolved organic contaminants, the presumptive technologies include air stripping, granular activated carbon (GAC), chemical/ultraviolet light oxidation, and aerobic biological reactors. For treatment of dissolved inorganic contaminants, the presumptive technologies include chemical precipitation, ion exchange/adsorption, electrochemical methods, and aeration. For treatment of both organic and inorganic constituents, a combination of the technologies listed above is recommended.

EPA's presumptive remedies will be considered in the development and screening of technologies phase of the FS and in developing the remedial alternatives for the NCIA off-site groundwater contamination.

7.4.6 **EPA Guidance on Remedial Action for Contaminated Groundwater at Superfund Sites**

This EPA guidance (EPA/540/G-88/003) provides information to make key decisions in developing, evaluating, and selecting groundwater remedial actions at Superfund sites (EPA 1988). This document focuses on policy issues and the decision-making approach and highlights key considerations that should be addressed during the remedy selection process. Guidance offered by this document will be considered in developing remedial alternatives.

7.4.7 **EPA Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA**

This EPA guidance (EPA/540/G-89/004) provides the methodology that the Federal Superfund program has established for characterizing the nature and extent of the risks posed by uncontrolled hazardous waste sites and for evaluating potential remedial options (EPA 1988). This document will be used as a guide in preparing the FS for the NCIA off-site groundwater.

7.4.8 **Risk Assessment Guidance for Superfund**

The Risk Assessment Guidance for Superfund (Volume I, Human Health Evaluation Manual [Part A]) was developed by EPA to provide guidance for developing health risk information at Superfund sites and to support CERCLA's requirement to protect human health and the environment (EPA 1989). This guidance was referenced in preparing the health exposure pathway analysis (Chapter 8).

7.4.9 **NYSDEC Selection of Remedial Actions at Inactive Disposal Sites**

As presented in TAGM HWR-90-4030, NYSDEC's guidance establishes a hierarchy of remedial technologies for inactive hazardous waste disposal sites in New York State and describes the preliminary screening and detailed analysis of remedial alternatives. (NYSDEC 1990). The guidelines set forth in this TAGM will be used in developing the NCIA off-site groundwater FS.

CHAPTER 8

HEALTH EXPOSURE PATHWAY ANALYSIS

8.1 INTRODUCTION

A health exposure pathway analysis was conducted for the NCIA off-site groundwater (in general terms, the contaminated groundwater situated downgradient of the NCIA, south of Old Country Road and Grand Boulevard) to identify and evaluate potential baseline exposure pathways to human health from groundwater contamination originating from the NCIA sites. Only off-site groundwater is evaluated in this exposure pathway analysis; individual NCIA sites are not assessed. The exposure pathway analysis was completed in accordance with EPA's Risk Assessment Guidance for Superfund – Volume I: Human Health Evaluation Manual (EPA 1989a). Results of this health exposure pathway analysis were used to determine the need for groundwater remedial actions and to help establish remedial action objectives for the off-site contaminated groundwater.

This exposure pathway analysis involved the following steps:

- Collection and evaluation of available groundwater data obtained from remedial investigation (RI) activities;
- Identification of potential contaminants of concern (COCs) for NCIA off-site groundwater to be evaluated in a qualitative assessment of exposure;
- Screening of the potential COCs via concentration-toxicity calculations;
- Investigation of potential pathways for human exposure to off-site groundwater contaminants;
- Toxicity assessment/hazard identification for the selected COCs; and
- Development of conclusions for potential exposures to groundwater COCs at locations downgradient of the NCIA.

These steps are described in detail in the following sections. While this exposure pathway analysis does not quantify the risks associated with the exposures (that is done in risk assessment), a qualitative evaluation of the uncertainties involved in the exposure pathway analysis procedures is presented here.

This health exposure pathway analysis is organized into the following sections:

8.2 DATA COLLECTION AND EVALUATION

8.2.1 Collection of Relevant Site Data

RI analytical data obtained for the off-site groundwater were evaluated for use in the health exposure pathway analysis. In accordance with EPA guidance (EPA 1989a), only positive sample results were used in this pathway exposure analysis. All tentatively identified compounds (TICs) were eliminated from further consideration, as these compounds were not positively identified. In general, the TICs detected were present at low concentrations and were not assumed to pose a significant risk to humans. A description of all groundwater analytical results is included in Chapter 5 of this report.

To appropriately focus the health exposure pathway analysis, a subset of the contaminants detected at each site, referred to as COCs, was selected for further evaluation. COCs are those compounds that pose the greatest potential public health risk at a particular site based on the concentrations detected and the relative toxicity of the compounds. Sections 8.2.2 and 8.2.3 discuss the identification and selection of COCs, respectively, for the NCIA off-site groundwater contaminant plumes.

8.2.1.1 Overview of RI Data Collection Activities. Monitoring well and hydropunch groundwater sampling data from the RI were used in the analysis of COCs for this human health exposure pathway analysis. To focus the evaluation on the off-site groundwater affected by the NCIA sites, data from monitoring wells and hydropunches located south of Old Country Road and Grand Boulevard were used. Data from groundwater samples collected within each of the three existing, distinct off-site plumes were combined in this exposure pathway analysis; plume-specific data evaluations were not conducted.

Monitoring well data from three recent RI sampling events (April 1999, August 1999, and January 2000) were evaluated. In order to evaluate the most current groundwater conditions in this pathway analysis, if an off-site monitoring well was sampled during more than one of the above-mentioned events, the most recent groundwater data were retained. Data from a total of 26 monitoring wells were used in the potential COC evaluation. The identification numbers and depths (ft bgs) of the monitoring wells included in the pathway analysis are noted below. The wells are categorized by sampling event.

April 1999 (1 monitoring well): N-10475 (57)

August 1999 (12 monitoring wells):

N-9939 (74)	N-11849 (60)
N-10329 (57)	N-11852 (100)
N-10472 (62)	N-11858 (60)
N-10476 (130)	N-11859 (60)
N-10479 (40)	N-11861 (60)
N-11848 (60)	N-11862 (60)

January 2000 (13 monitoring wells):

EW-1B (164)	NRMW-4 (70)
EW-1C (516)	N-10474 (60)
EW-2B (142)	N-10477 (57)
EW-2C (514)	N-10478 (121)
NRMW-1 (70)	N-11851 (65)
NRMW-2 (70)	N-11860 (60)
NRMW-3 (70)	

A total of 38 hydropunch samples collected in January and February 2000 from four off-site locations (GWHP-1, -2, -3, and –4) were also used in the evaluation of potential off-site groundwater COCs. The hydropunch sample identification numbers and sample depth intervals (ft bgs) are listed below.

GWHP-1 (60-62)	GWHP-2 (58-60)	GWHP-3 (58-60)	GWHP-4 (58-60)
GWHP-1 (70-72)	GWHP-2 (70-72)	GWHP-3 (68-70)	GWHP-4 (68-70)
GWHP-1 (80-82)	GWHP-2 (78-80)	GWHP-3 (78-80)	GWHP-4 (78-80)
GWHP-1 (90-92)	GWHP-2 (94-96)	GWHP-3 (88-90)	GWHP-4 (88-90)

GWHP-1 (98-100)	GWHP-2 (100-102)	GWHP-3 (98-100)	GWHP-4 (108-110)
GWHP-1 (108-110)	GWHP-2 (108-110)	GWHP-3 (108-110)	GWHP-4 (118-120)
GWHP-1 (118-120)	GWHP-2 (118-120)	GWHP-3 (118-120)	GWHP-4 (138-140)
GWHP-1 (128-130)	GWHP-2 (128-130)	GWHP-3 (128-130)	GWHP-4 (148-150)
GWHP-1 (138-140)	GWHP-2 (138-140)	GWHP-3 (138-140)	
GWHP-1 (148-150)	GWHP-2 (148-150)	GWHP-3 (148-150)	

The locations of all monitoring wells and hydropunches are shown in Chapter 3 of this report. A complete discussion of RI data collection activities is also included within Chapter 3 of this report.

8.2.2 Identification of Potential Contaminants of Concern

Three criteria were used to identify the potential COCs for the NCIA off-site groundwater contamination. The first was the comparison of positive sample results to applicable New York State standards; chemicals exceeding standards were given higher priority for selection as COCs. All groundwater sample results were compared to NYSDEC Guidance Values for Class GA groundwater. The degree to which a chemical concentration exceeded the standard or guidance value was also taken into consideration as part of this criterion. For instance, if a chemical concentration exceeded the applicable standard by several orders of magnitude, the chemical was typically given more weight for consideration as a potential COC than a chemical that minimally exceeded its standard.

The second criterion was an evaluation of the frequency of chemical detection; the higher the frequency, the higher the priority given for consideration as a COC. If a chemical was detected in the groundwater samples collected, more than 50 percent of those detected values typically had to exceed the standard for that chemical to be given further consideration in the COC selection process.

The third criterion was whether the chemical was related to suspected discharges that were reported to have historically occurred at the properties/sites within the NCIA (i.e., discharges of wastes to dry wells or sanitary drains). Contaminants possibly associated with discharges or other site activities were given special consideration.

Analytical results for the 64 groundwater samples (26 monitoring well samples and 38 hydropunch samples) considered in this exposure pathway analysis are summarized in Table 8-1. All samples were analyzed for VOCs. As shown in Table 8-1, nine potential

COCs were identified in the off-site groundwater. 1,1-DCA, 1,1-DCE, 1,2-DCA, 1,2-DCE (total), 1,1,1-TCA, 1,1,2-TCA, PCE, TCE, and vinyl chloride were retained as potential COCs based on frequencies of detection and detected concentrations that were in exceedence of NYS Class GA groundwater standards. Although 1,2-DCA and vinyl chloride were each detected in only 3 of the 64 groundwater samples evaluated, they were retained as potential COCs since all of the detected concentrations were above the respective Class GA standard. These two compounds are also breakdown products of some of the other potential COCs identified. 1,1,2-TCA was only detected in 5 of 64 samples; however, since this compound exceeded the groundwater criterion in 80% of the samples that had detected concentrations, it was also retained for further analysis.

8.2.3 Concentration-Toxicity Screening

A concentration-toxicity screening of the preliminary lists of COCs for the NCIA off-site groundwater contamination was conducted to develop a final list of COCs. This screening procedure identifies those contaminants in the off-site groundwater that are most likely to substantially contribute to the human health risk resulting from exposure to that matrix. This assessment is conducted by calculating a chemical score (R_i) for each potential groundwater COC according to the following equations:

- Noncarcinogenic effects:

$$R_i = \frac{\textit{Maximum contaminant concentration}}{\textit{RfD}}$$

where RfD equals the reference dose.

- Carcinogenic effects:

$$R_i = \textit{Maximum contaminant concentration x slope factor}$$

The maximum contaminant concentration used in these equations is the maximum detected concentration for each COC identified in the groundwater data that were reviewed, as shown in Table 8-1. The slope factors and reference doses (RfDs) used in these equations were obtained from the EPA's on-line database (updated 13 April, 2000) or HEAST Report (EPA 1997). The oral RfD for a contaminant was used to calculate the chemical score unless the inhalation value (reference concentration, RfC or RfD_i) was more conservative (i.e., smaller than the oral value). The inhalation slope factor for

TABLE 8-1

POTENTIAL CONTAMINANTS OF CONCERN IN GROUNDWATER
NCIA Off-Site Groundwater

PARAMETER	FREQUENCY OF DETECTION [1]	RANGE OF DETECTED CONCENTRATIONS (ug/l)	NYSDEC Class GA Objectives [2] (ug/l)	PERCENTAGE ABOVE STANDARD [3]	POTENTIAL COC
VOLATILE ORGANICS (mg/kg)					
Methylene chloride	5/64	1 - 17	5	40%	No
Acetone	3/64	1 - 6	50	0%	No
Carbon Disulfide	1/64	2 - 2	NA	0%	No
Chloroethane	1/64	2 - 2	5	0%	No
Chloroform	12/64	1 - 8	7	17%	No
1,1-DCA	19/64	1 - 880	5	58%	Yes
1,1-DCE	17/64	2 - 1700	5	71%	Yes
1,2-DCE (total)	11/64	1 - 94	5	55%	Yes
1,2-DCA	3/64	4 - 22	0.6	100%	Yes
TCE	22/64	2 - 1800	5	82%	Yes
1,1,1-TCA	33/64	1 - 820	5	58%	Yes
1,1,2-TCA	5/64	1 - 8	1	80%	Yes
PCE	23/64	1 - 1100	5	74%	Yes
1,3-Dichlorobenzene	1/64	4 - 4	3	100%	No
1,4-Dichlorobenzene	1/64	1 -1	3	0%	No
Vinyl Chloride	3/64	5 - 6	2	100%	Yes
Toluene	1/64	1 -1	5	0%	No
Xylene (total)	5/64	2 - 3	5	0%	No

1 - Only compounds that were detcted in at least one sample are included.
2 - NYSDEC Division of Water Technical and Operational Guidance Series (1.1.1), June 1998.
3 - Percent of detected values that are above the standard.

carcinogenic effects was used unless no inhalation value was available or the oral slope factor was more conservative (i.e., larger than the inhalation slope factor).

Following the calculations of chemical scores for both the noncarcinogenic and the carcinogenic effects for each potential groundwater COC, the chemical scores were summed (R_t). Chemical scores for noncarcinogenic and carcinogenic effects were summed separately. A relative risk for each contaminant was then calculated by dividing the contaminant's chemical score by the total of the noncarcinogenic or carcinogenic chemical scores (as appropriate), as follows:

$$Relative\ risk = \frac{R_i}{R_t}$$

This calculated relative risk is not a quantitative assessment of the risk posed by a particular contaminant and is used only for comparative purposes in the concentration-toxicity screening. The concentration-toxicity screening calculations for the off-site groundwater are included in Table 8-2.

Based on the calculated relative risks for the off-site groundwater contaminants, those chemicals that did not contribute substantially to the overall risk to human health from exposure to that matrix (i.e., those contaminants presenting a relative risk equal to or less than 0.01, or 1.0% of the total risk) were eliminated. Table 8-3 summarizes the final list of COCs, including both carcinogenic and noncarcinogenic effects, that were retained based on the concentration-toxicity screening evaluation.

8.3 EXPOSURE ASSESSMENT

The purpose of an exposure assessment is to identify exposure pathways by which humans may contact the groundwater COCs. Potential exposure pathways were identified for both "current use" and "future use" scenarios.

8.3.1 Identification and Screening of Exposure Pathways

An exposure pathway consists of a source and mechanism of contaminant release, a receiving matrix, a point of potential human contact with the contaminated matrix (i.e., exposure point), and an exposure route (i.e., inhalation, ingestion, or dermal contact). If an exposure pathway is not complete because it does not include a receiving matrix, a

TABLE 8-2
CONCENTRATION-TOXICITY SCREENING FOR CONTAMINANTS OF CONCERN
GROUNDWATER SAMPLES
NCIA Off-Site Groundwater

ANALYTE	MAXIMUM CONCENTRATION DETECTED (ug/l)	SLOPE FACTOR [a] $(mg/kg/day)^{-1}$	REFERENCE DOSE [b] (mg/kg/day)	CHEMICAL SCORE (RI)	RI/Rt
NONCARCINOGENIC					
VOCs:					
Vinyl Chloride	6	-	NV	-	-
1,1-DCE	1700	-	9.00E-03	1.89E+05	3.0E-01
1,1-DCA	880	-	1.00E-01	8.80E+03	1.4E-02
1,2-DCE (total)	94	-	9.00E-03	1.04E+04	1.6E-02
1,2-DCA	22	-	1.40E-03	1.57E+04	2.5E-02
1,1,1-TCA	820	-	2.80E-01	2.93E+03	4.6E-03
1,1,2-TCA	8	-	4.00E-03	2.00E+03	3.1E-03
TCE	1800	-	6.00E-03	3.00E+05	4.7E-01
PCE	1100	-	1.00E-02	1.10E+05	1.7E-01
CARCINOGENIC					
VOCs:					
Vinyl Chloride	6	1.90E+00	-	1.14E+01	1.0E-02
1,1-DCE	1700	6.00E-01	-	1.02E+03	9.2E-01
1,1-DCA	880	NV	-	-	-
1,2-DCE (total)	94	NV	-	-	-
1,2-DCA	22	9.10E-02	-	2.00E+00	1.8E-03
1,1,1-TCA	820	NV	-	-	-
1,1,2-TCA	8	5.70E-02	-	4.56E-01	4.1E-04
TCE	1800	1.10E-02	-	1.98E+01	1.8E-02
PCE	1100	5.20E-02	-	5.72E+01	5.1E-02

NV - No value available.
a - Slope factor based on inhalation unit risk unless oral unit risk more conservative.
Source: EPA's Integrated Risk Information System (IRIS) (January 2000 update) or the Health Effects Assessment Summary Tables (HEAST) Report.
b - Chronic RfD for ingestion unless inhalation value more conservative. Source: EPA's Integrated Risk Information System (IRIS) (January 2000 update) or the Health Effects Assessment Summary Tables (HEAST) Report

TABLE 8-3

POTENTIAL CONTAMINANTS OF CONCERN FOR INCLUSION IN THE HEALTH EXPOSURE ASSESSMENT (Off-Site Groundwater)

(After the Concentration-Toxicity Screening)

LOCATION	NONCARCINOGENIC EFFECTS	CARCINOGENIC EFFECTS
Off-Site Groundwater		
	1,1 Dichloroethene 1,1 Dichloroethane 1,2 Dichloroethene (total) 1,2 Dichloroethane Trichloroethene Tetrachloroethene	Vinyl Chloride 1,1 Dichloroethene Trichloroethene Tetrachloroethene

point of potential human contact, or an exposure route, then no risk exists. Potential exposure pathways associated with the off-site groundwater plumes for current and future land use scenarios are discussed. Potential exposure pathways that have been identified and screened for the off-site contamination are included in Table 8-4 (current land use scenario) and Table 8-5 (future use scenario).

The pathways have been arranged according to locations of the off-site groundwater that were determined to be contaminated (i.e., plumes) based on recent environmental monitoring conducted (contaminant plume maps are included in Chapter 5 of this report). The release source and mechanism by which the receiving groundwater likely became contaminated are then identified, followed by the exposure points and routes by which humans may realistically encounter the COCs in the off-site groundwater. The potential exposure pathways were then evaluated (screened) to identify any complete pathway (refer to Tables 8-4 and 8-5).

The current off-site land uses in locations downgradient of the NCIA are based on the existing residential, commercial, and institutional zoning of the properties. The future land use scenario is based on the presumption of continued use of these properties as presently zoned and also considers remedial activities that may take place to address the groundwater contamination at specific off-site locations.

Although source control and groundwater remedies have been proposed at individual sites within the NCIA, the future land use scenario in this pathway analysis does not include changes in the off-site contaminant plumes that may occur as a consequence of these remedial activities in the NCIA. This is because of uncertainties associated with the implementation timeframes and effectiveness of the proposed NCIA remedies. Thus, the location and extent of the off-site groundwater contaminant plumes for the current and future land use scenarios are identical in this pathway analysis.

8.3.1.1 Current Land Use Scenario.

Groundwater contamination originating from the sites/properties within the NCIA has been traced to off-site early warning monitoring wells and two potable supply wells (located approximately 700 ft south of Old Country Road) in the Bowling Green Water District. All of the off-site groundwater contamination, based on data from the RI, is within the Bowling Green Water District, and it is assumed that no contamination has migrated to downgradient areas which are not serviced by Bowling Green wells. While

Table 8-4
SCREENING OF POTENTIAL EXPOSURE PATHWAYS
CURRENT LAND USE SCENARIO
NCIA Off-Site Groundwater

RECEIVING MATRIX	RELEASE SOURCE	RELEASE MECHANISM	EXPOSURE POINT	EXPOSURE ROUTES	PATHWAY RETAINED?	EXPOSURE TIMEFRAME	SCREENING COMMENTS
Groundwater	Historic discharge of wastes to dry wells/on-site disposal systems at NCIA sites.	Leaching/ groundwater migration.	Off-Site (south of Old Country Road and Grand Boulevard).	Inhalation; Ingestion; Dermal Contact.	No	Long-Term	Exposure routes to off-site residents, workers, and visitors exist via potable (tap) water; however, exposure pathway not retained because potable water treated prior to consumption.

Table 8-5
SCREENING OF POTENTIAL EXPOSURE PATHWAYS
FUTURE LAND USE SCENARIO
NCIA Off-Site Groundwater

RECEIVING MATRIX	RELEASE SOURCE	RELEASE MECHANISM	EXPOSURE POINT	EXPOSURE ROUTES	PATHWAY RETAINED?	EXPOSURE TIMEFRAME	SCREENING COMMENTS
Groundwater	Historic discharge of wastes to dry wells/on-site disposal systems at NCIA sites.	Leaching/ grounwater migration.	Off-Site (south of Old Country Road and Grand Boulevard).	Inhalation; Ingestion; Dermal Contact.	No	Short-Term; Long-Term	Short-term exposures to construction and remediation workers may exist, but pathway not retained because engineering controls can be implemented. Potential future inhalation exposure route to off-site residents, workers, and visitors may exist if in-situ treatment system established (via off-gas), but pathway not retained because engineering controls can be implemented. Future exposure routes to off-site residents workers, and visitors exist via potable (tap) water; however, exposure pathway not retained because treatment of groundwater prior to potable water distribution is expected to continue.

potential exposures (ingestion, inhalation, and dermal contact) via potable water (tap water) for residents, workers, and visitors of the NCIA off-site area have been identified, these exposure pathways are incomplete. Institutional controls (water treatment via air stripping of VOCs and granular activated carbon filtration) at the Bowling Green supply wells remove the contaminants from the groundwater prior to distribution in the public drinking water supply thereby eliminating this potential exposure route.

Since, under Article IV (1987) of the Nassau County Public Health Ordinance, the installation of private water systems/wells in areas served by an existing public water system is prohibited, it was assumed that potential exposures to groundwater COCs via private wells does not exist in the off-site area. In addition, at the request of NYSDEC it was presumed that no private wells exist in the NCIA or in locations downgradient within the area serviced by the Bowling Green Water District.

Finally, groundwater in the off-site area exists at depths (approximately 50 to 55 ft bgs) that do not likely present exposure pathways for construction or utility workers, as excavation for these activities is likely to occur only in the upper unsaturated zone. Therefore, the contaminated off-site groundwater was not considered as a current exposure medium.

8.3.1.2 Future Land Use Scenario.

Individuals involved in future drilling and excavation for implementation of remediation systems may have short-term exposures to contaminated groundwater. However, the exposure pathway for remediation workers is assumed to be eliminated through the use of engineering controls, personal protective equipment, and appropriate site health and safety monitoring. Off-site groundwater is not considered to present a complete exposure pathway in the future for routine utility or construction work because, as discussed above for the current land use scenario, the groundwater contamination is at substantially greater depths than those at which these types of work are expected to occur. Although it is also possible that inhalation exposure routes for groundwater COCs may exist in the future (i.e., inhalation of off-gas from an in-situ groundwater treatment system), it is assumed that engineering controls will be implemented as needed, and no future exposure pathways will exist for area residents, workers, and visitors.

As noted in the current land use scenario, groundwater contamination has been traced to off-site early warning monitoring wells and two potable supply wells in the Bowling

Green Water District. For the future scenario, it was assumed that the extent of the off-site groundwater contamination will be completely within the Bowling Green Water District; that is, it is assumed that no contamination will have migrated to downgradient areas which are not serviced by Bowling Green wells. While potential exposure routes (ingestion, inhalation, and dermal contact) via contaminated potable water may exist, institutional controls are expected to be continually implemented into the future at the Bowling Green supply wells to remove the groundwater contaminants prior to distribution of the water in the public drinking water supply. It is also assumed that no private wells will be installed in the Bowling Green Water District at locations south of the NCIA in the future, as per Article IV of the Nassau County Public Health Ordinance. Thus, no future exposure pathway to off-site groundwater contamination was identified.

8.4 TOXICITY ASSESSMENT

This section discusses the currently documented health effects that have been associated with exposure to the site COCs (1,1-DCA, 1,1-DCE, 1,2-DCE, 1,2-DCA, PCE, TCE, vinyl chloride).

8.4.1 1,1-Dichloroethane (1,1-DCA)

1,1-DCA is a colorless, oily liquid with a chloroform-like odor. 1,1-DCA is often used as a solvent and cleaning and degreasing agent as well as in organic synthesis as an intermediate. Synonyms for 1,1-DCA include; asymmetrical dichloroethane, ethylidene chloride, and 1,1 ethylidene dichloride. Routes of entry include inhalation, ingestion, and skin and eye contact. 1,1-DCA can affect you when breathed in. It may damage the developing fetus. Exposure can cause drowsiness, unconsciousness, and death. High exposure may damage the liver or kidneys. Contact can cause eye and skin irritation with eye burns. Long-term exposure can cause thickening and cracking of skin. 1,1-DCA is a highly flammable liquid and a dangerous fire hazard and should never be used near combustion sources. The highly toxic phosgene gas can be formed if 1,1-DCA is used near welding (Sittig 1991).

In pure form 1,1-DCA reaches its flash point at 2°F. At 68°F 1,1 DCA is 0.04% soluble in water and has a vapor pressure of 182 mm Hg. The OSHA permissible exposure limit for 1,1-DCA is 100 ppm (NIOSH 1997).

8.4.2 1,1- Dichloroethylene (1,1-DCE)

1,1-DCE is a volatile liquid, with a mild sweet odor resembling that of chloroform. 1,1-DCE is used to manufacture polyvinylidene copolymers. Synonyms for 1,1-DCE include vinylidene chloride, and 1,1-dichloroethene. A common route of entry is the inhalation of the vapor, but 1,1-DCE can also pass through skin. 1,1-DCE is a possible human carcinogen. It may damage the developing fetus and cause reproductive damage in males. Exposure can irritate the eyes, nose, and throat. Contact can irritate and burn the eyes and skin. High levels cause a "drunken" feeling that leads to unconsciousness. Repeated exposures may damage the liver, kidneys, and lungs. It is a highly flammable and reactive chemical, and a dangerous fire and explosion hazard (Sittig 1991).

In pure form 1,1-DCE reaches its flash point at -2°F. At 68°F 1,1-DCE is 0.04% soluble in water and has a vapor pressure of 500 mm Hg. OSHA has not published a permissible exposure limit for 1,1-DCE (NIOSH 1997).

8.4.3 1,2-Dichloroethylene (1,2-DCE)

1,2-DCE is used as a solvent for waxes, resins and acetylcellulose. It is also used in the extracction of rubber, as a refrigerant, in the manufacture of pharmaceuticals, and in the extraction of oils and fats from fish and meat. Synonyms for 1,2-DCE include: acetylene dichloride, sym-dichloroetylene, and 1,2 dichloroethene. 1,2-DCE exists in two isomers, cis and trans, with variations in toxicity between these two forms. The routes of entry into the body are via the inhalation of the vapor, by ingestion, and by skin and eye contact. The respiratory system, the eyes, and the central nervous system are greatly affected by 1,2-DCE. As a liquid, it can act as a primary irritant, producing dermatitis and irritation of mucous membranes. Symptoms of acute exposure to high concentrations include dizziness, nausea, and frequent vomiting, and central nervous system intoxication similar to that caused by alcohol (Sittig 1991).

In pure form 1,2-DCE reaches its flash point at 36-39°F. At 68°F 1,2-DCE is 0.4% soluble in water and has a vapor pressure of 180-265 mm Hg. The OSHA permissible exposure limit for 1,2-DCE is 200 ppm (NIOSH 1997).

8.4.4 1,2-Dichloroethane (1,2-DCA)

1,2-DCA is widely used in the manufacture of ethylene glycol, polyvinyl chloride, nylon, viscose rayon, styrene-butadiene rubber, and various plastics. It is a solvent for resin, asphalt, bitumen, rubber, cellulose acetate, and paint; a degreaser in the engineering, textile, and petroleum industries; and an extracting agent for soybean oil and caffeine. It is also used as an antiknock agent in gasoline, a pickling agent, a fumigant, and a dry cleaning agent. Synonyms for 1,2-DCA include ethylene dichloride, ethylene chloride, and glycol dichloride. 1,2-DCA is a colorless, flammable liquid which has a pleasant odor (Sittig 1991).

Routes of entry include inhalation of the vapor, skin absorption of the liquid, ingestion, and eye contact. Short-term exposures via the inhalation route may cause dizziness, nausea, and vomiting. Inhalation exposures to elevated concentrations may cause trembling, headaches, abdominal cramps, liver and kidney damage, fluid build-up in the lungs, coma, and death. Long-term exposure may cause eye, nose, and throat irritation,nausea, vomiting, loss of appetite, nerve damage, and liver and kidney damage. 1,2-DCA is known to cause cancer in laboratory animals. The OSHA permissible exposure limit for 1,2-DCA is 50 ppm (NIOSH 1997).

8.4.5 Tetrachloroethylene (PCE)

PCE is a clear, colorless, nonflammable liquid with a characteristic odor. PCE is a widely used solvent with particular use as a dry cleaning agent, a degreaser, a chemical intermediate, and a fumigant. Synonyms for PCE include: perchloroethylene, carbon dichloride, Ethylene tetrachloride, perclene, and tetrachloroethene. Routes of entry include inhalation of vapor, percutaneous absorption of liquid, ingestion, skin, and eye contact. Short term inhalation exposure can cause irritation of nose, mouth and throat, dizziness, headaches, and lightheadedness. Short term inhalation exposures at elevated levels can cause loss of muscle control, difficulty breathing, irritability, tremors, convulsions, paralysis, heart irregularities and death. Long term inhalation exposures have been reported to cause headaches, sleeplessness, abdominal pains, skin infection, kidney and liver damage, fluid in the lungs and coma. Skin exposure can cause dry, scaly skin, a mild burning sensation, redness and inflammation. Eye exposure causes burning and irritation. Ingestion can cause nausea, vomiting, diarrhea, weakness and loss of muscle control (Sittig 1991).

In pure form PCE at 68°F, is 0.02% soluble in water and has a vapor pressure of 14 mm Hg. The OSHA permissible exposure limit for PCE is 100 ppm (NIOSH 1997).

8.4.6 Trichloroethylene (TCE)

TCE is a colorless, nonflammable, noncorrosive liquid with a sweet odor. It has been used as a solvent for vapor degreasing, dry cleaning, extracting caffeine from coffee and in the production of pesticides, waxes, resins, paints, and varnishes. Synonyms for TCE include: trichloroethene, ethylene trichloride, and ethinyl trichloride. The short-term effects of exposure to low levels of TCE include headaches, sleepiness, nausea, vomiting, dizziness, and coughing. Long-term exposure effects include giddiness, nervous exhaustion, and an increased sensitivity to alcohol. Exposure to higher concentrations can alter the heart rate. Repeated dermal contact can cause excessive dryness, cracking, burning, and loss of the sense of touch or temporary paralysis of the fingers. Most of these effects cease after the exposure has stopped. The routes of entry into the body are through inhalation, ingestion, and skin and eye contact (Sittig 1991).

In pure form TCE at 68°F, is 0.0001% soluble in water and has a vapor pressure of 58 mm Hg. The OSHA permissible exposure limit is 100 ppm (NIOSH 1997).

8.4.7 Vinyl Chloride

Vinyl chloride is a flammable gas at room temperature, and is usually encountered as a cooled liquid. The colorless liquid forms a vapor which has a pleasant, ethereal odor. Synonyms for vinyl chloride include; chloroethylene, chloroethene, and monochloroethylene. Vinyl chloride is used in the manufacture of polyvinyl chloride and other resins. Route of entry into the body is through inhalation. Exposure can cause a feeling of intoxication, tiredness, drowsiness, abdominal pain, numbness, pains in joints, coughing, sneezing, irritability, and loss of appetite and weight. Long term exposure may cause club-like swelling and shortening of finger tips, thickened skin, and damage to bones and joints of arms and legs. Vinyl chloride has caused liver cancer in occupationally exposed individuals (Sittig 1991).

In pure form vinyl chloride at 68°F, is 0.1% soluble in water and has a vapor pressure of 3.3 atm. The OSHA permissible exposure limit is 1 ppm (NIOSH 1997).

8.5 UNCERTAINTY ANALYSIS

Uncertainty is introduced to an exposure pathway analysis through a number of sources. Uncertainty can occur in the measurement of contaminant concentrations in site media and in toxicity values (reference doses and cancer slope factors) used for evaluating the health risks.

As noted in the analytical summary data in the RI, a number of compound values have been qualified by the data validator, indicating uncertainty in the data as to the contaminant concentrations present in the sample. The uncertainty associated with the data therefore results in uncertainty in the chemical scores obtained in the concentration-toxicity screening of the COCs.

The slope factors developed by EPA are generally conservative and are intended to represent an upper-bound limit of the probability of a cancer response. Thus, the actual risk of cancer due to exposure to a contaminant is likely to be lower than the risk calculated using the EPA value. The reference doses are also conservative, and they are generally considered to have an uncertainty of an order of magnitude or more. Consequently, the chemical scores calculated for the COCs during the concentration-toxicity screening (using published reference doses for noncarcinogenic effects and slope factors for carcinogenic effects) may differ from true values.

8.6 CONCLUSIONS

A focused, qualitative health exposure pathway analysis was conducted for the NCIA off-site groundwater contamination to determine COCs and identify potential exposure routes. COCs were selected by reviewing the groundwater analytical data obtained during RI sampling events and determining the frequencies of detection and ranges of detected concentrations of the compounds. A concentration-toxicity screening was then performed to identify those contaminants most likely to contribute significantly to human health risk downgradient of the NCIA. Seven COCs (PCE, TCE, 1,1-DCA, 1,1-DCE, 1,2-DCA, 1,2-DCE, and vinyl chloride) were identified in the off-site groundwater.

No current or future exposure pathways associated with ingestion, inhalation, or dermal contact with potable (tap) water were identified for any population as institutional treatment controls remove the COCs prior to the distribution of the groundwater to the municipal water system. These controls are presently implemented by the Bowling

Green Water District and are anticipated to continue into the future. Potential short-term exposures to contaminated groundwater by remedial workers were identified to exist in the future land use scenario. In addition, short-term inhalation exposures to contamination by individuals that live, work, or visit the area may exist in the future (i.e., via off-gas from a groundwater remediation system). However, these two short-term future pathways can be eliminated with engineering controls, personal protective equipment, and appropriate site health and safety monitoring.

CHAPTER 9

OBJECTIVES OF THE FEASIBILITY STUDY

9.1 INTRODUCTION

The feasibility study (FS) portion of this RI/FS report is presented in Chapters 9 through 12. The primary objective of the FS is to ensure that appropriate remedial alternatives are developed and evaluated such that relevant information concerning remedial action can be presented to a decision-maker (i.e., NYSDEC) and an appropriate remedy selected.

This FS presents remedial alternatives for the impacted off-site groundwater at the NCIA site. In terms of the FS, the NCIA "site" is defined as the properties bound by the Long Island Railroad to the north, Old Country Road to the south, Grand Boulevard and Grand Street to the west, and Frost Street to the east. Groundwater contamination from the NCIA extends south and southwest in the direction of groundwater flow, as shown in Figure 9-1. This FS addresses the off-site groundwater, or the portions of the contaminant plumes south of Old Country Road and Grand Boulevard (see Figures 9-2 through 9-5).

As shown in Figures 9-2 through 9-5, three distinct contaminant plumes originated within the NCIA and have impacted the groundwater to greater than 125 ft bgs (Appendix G also includes a complete set of groundwater contaminant plume maps). The extents of these plumes at depth intervals are depicted in Figures 9-2 (0 - 64 ft bgs), 9-3 (65 – 99 ft bgs), 9-4 (100 – 124 ft bgs), and 9-5 (125 – 200 ft bgs). These plumes have been designated as the "western", "central", and "eastern" plumes to ease their identification in the RI/FS, as shown on Figure 9-2.

To date, FS reports have been prepared for NYSDEC that address some of the individual sites within the NCIA. The execution of an active remedial alternative (i.e., one that makes use of a treatment technology) at an individual site will impact the size, shape, and contaminant concentration of the overall groundwater plume. For instance, if a source control and/or groundwater response remedy were implemented at the Frost Street sites, the "eastern" on-site contaminant plume would be expected to shrink or reduce in size with time, and its VOC concentration would decrease although the off-site contaminant plume may not initially change.

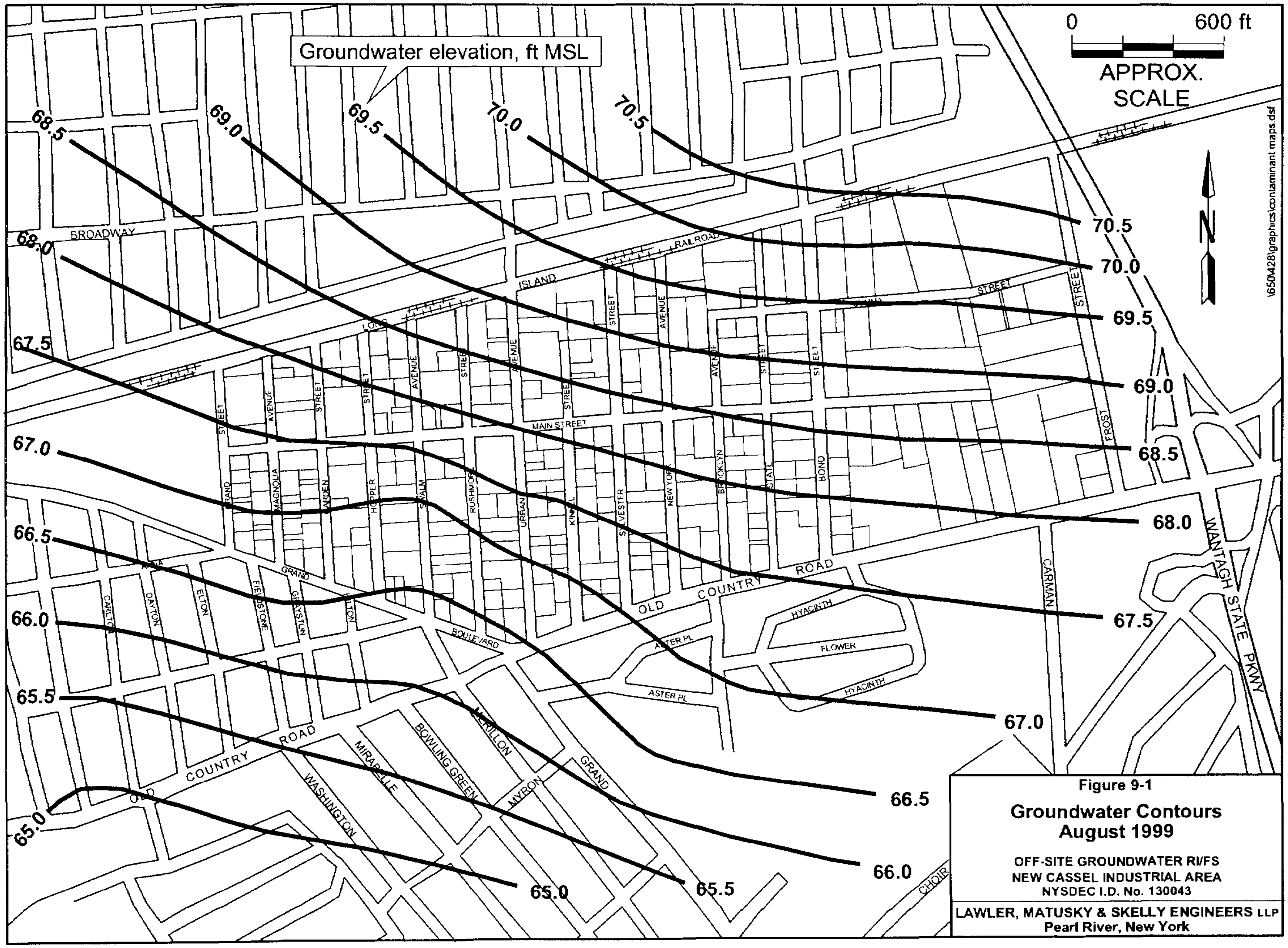


Figure 9-1

Groundwater Contours
August 1999

OFF-SITE GROUNDWATER RI/FS
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

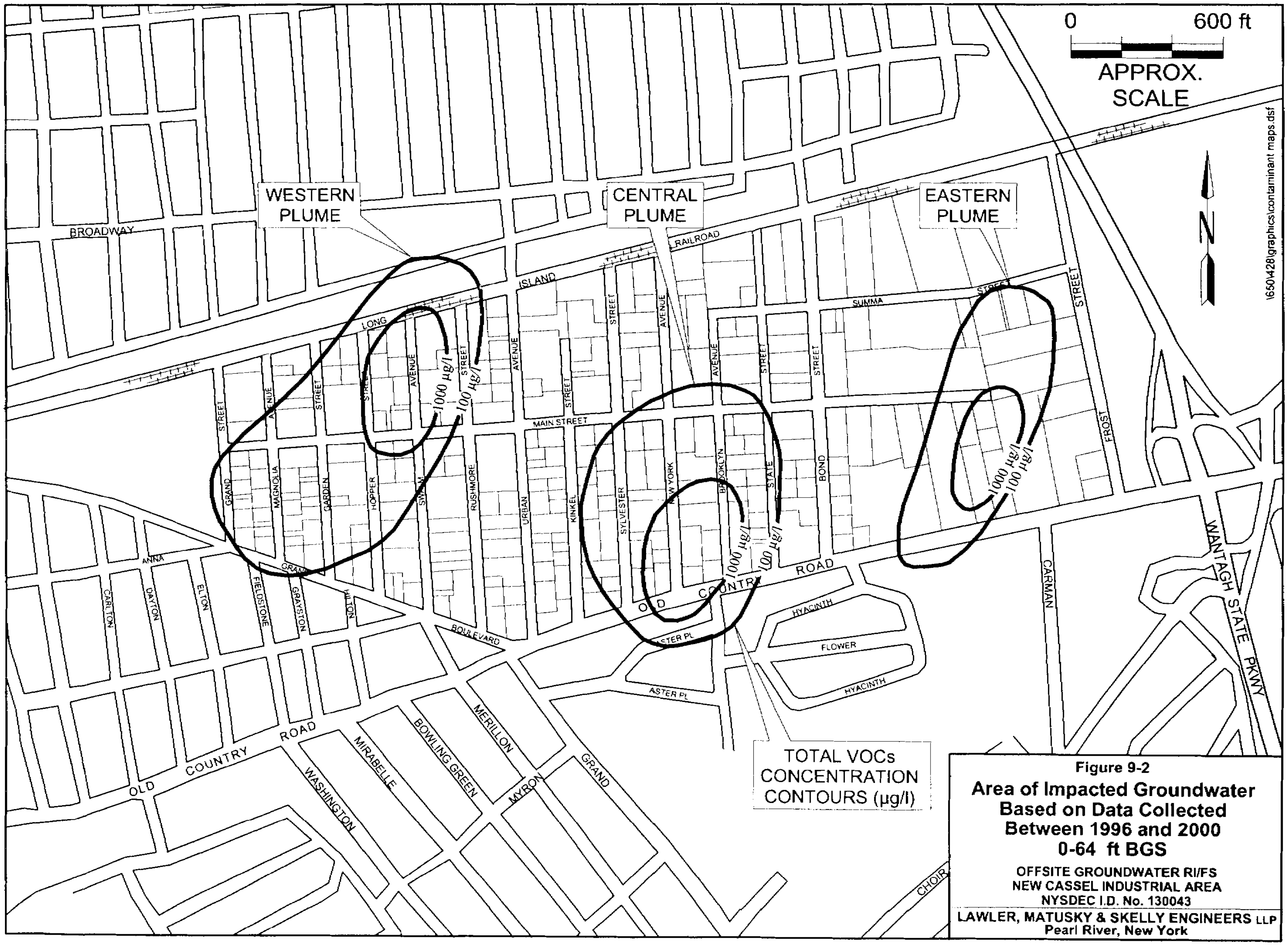


Figure 9-2

Area of Impacted Groundwater Based on Data Collected Between 1996 and 2000 0-64 ft BGS

OFFSITE GROUNDWATER RI/FS
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

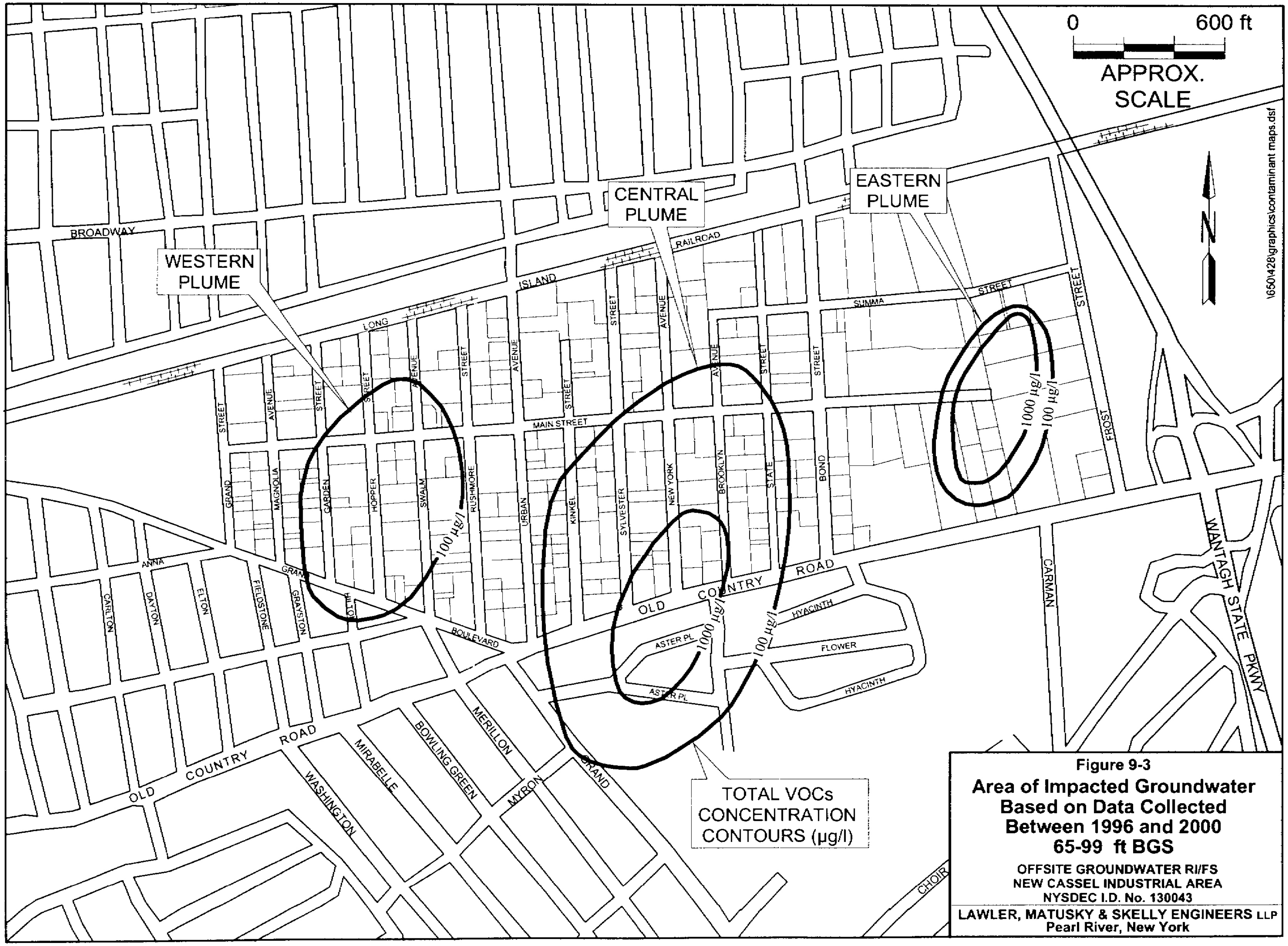
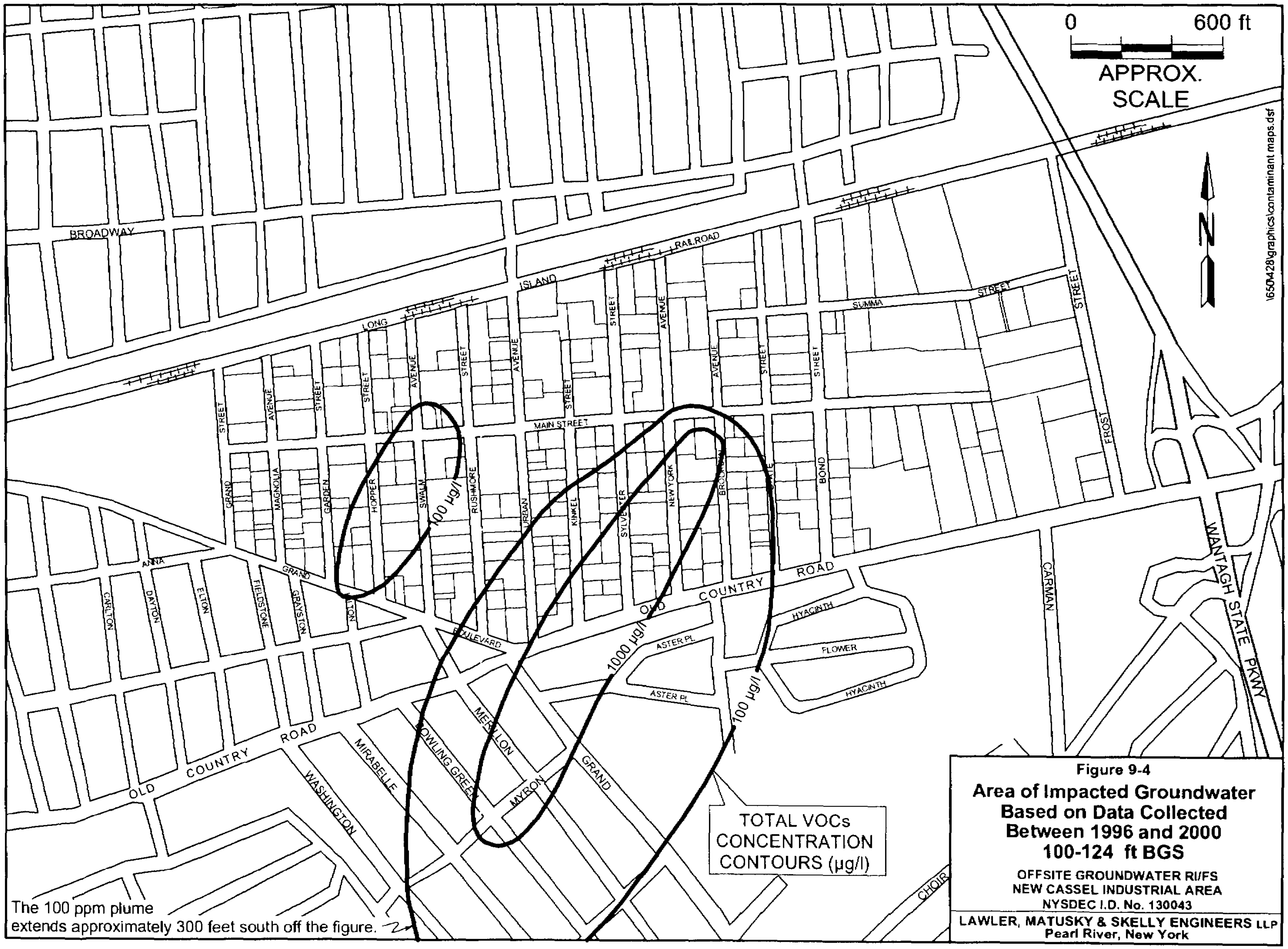


Figure 9-3

Area of Impacted Groundwater Based on Data Collected Between 1996 and 2000 65-99 ft BGS

OFFSITE GROUNDWATER RI/FS
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York



The 100 ppm plume extends approximately 300 feet south off the figure.

Figure 9-4

Area of Impacted Groundwater Based on Data Collected Between 1996 and 2000 100-124 ft BGS

OFFSITE GROUNDWATER RI/FS
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

Figure 9-5
Area of Impacted Groundwater Based on Data Collected Between 1996 and 2000 125-200 ft BGS
OFFSITE GROUNDWATER RI/FS
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043
LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

R2-0000507

RI/FSs have been completed at many of the sites in the NCIA, and active groundwater remedial systems are in-place or planned at several sites. It is also likely that additional on-site groundwater remedial systems will be implemented as RI/FSs are completed at other sites. Descriptions of active and proposed remedial activities for sites within the NCIA are provided in Chapter 11.

It is assumed that these on-site remediations will, when implemented, effectively "cut-off" the source of the contaminant plumes and prevent the further release of contaminants off-site. Without a contaminant source, the off-site plumes should with time gradually decrease. However, since no modeling of groundwater contaminant transport was conducted on the NCIA plumes, it is unknown how long it will take for the off-site plumes to be remediated. Therefore, this FS developed remedial alternatives to address the off-site plumes as they exist in the recent studies (1999-2000), assuming no upgradient continuing sources. Conceptual designs of remediation systems are presented in Chapter 11.

Although it was assumed that active measures would be taken at each of the sites within the NCIA, as warranted, to reduce the impact presented by the source areas, realistically all of these on-site remediations cannot be implemented immediately. Therefore, the off-site plumes will continue to change, possibly increasing or decreasing in size and concentrations, from the plumes derived from data from recent studies (1999 – 2000). This FS only address the existing off-site plumes. If the plumes have changed with time and remediations, the selected off-site remedies may be altered at the design phase as necessary to reflect the new sizes or concentrations of the plumes. Records of Decision (RODs) and proposed remedial action plans (PRAPs) that are expected in the next twelve months are summarized in Chapter 11.

9.2 OBJECTIVES OF THE FEASIBILITY STUDY

The FS process (1) identifies remedial action objectives, (2) identifies potential treatment and containment technologies that will satisfy these objectives, (3) screens the technologies based on their effectiveness, implementability, and cost, and (4) assembles technologies and their associated containment or disposal requirements into alternatives for the contaminated media at the site. Remedial alternatives are developed and evaluated with the first seven criteria specified by the National Oil and Hazardous Substances Contingency Plan (NCP) and New York State hazardous waste regulations (6 NYCRR Part 375). These evaluation criteria are (1) protection of human health and the environment, (2) compliance with SCGs, (3) reduction of toxicity, mobility, and volume, (4) short-term effectiveness, (5) long-term effectiveness and permanence, (6) implementability, and (7) cost. The process of alternative development, screening, and evaluation is done in context with remedial action objectives developed for the site and the quantities of contaminated materials present. The eighth criterion, community and state acceptance, is also to be considered in evaluating the remedial alternatives. Community acceptance cannot be assessed until public comments have been received on the RI/FS report and PRAP. The ROD for the off-site groundwater will address community comments.

This chapter presents the remedial action objectives applied to the NCIA off-site groundwater.

9.3 REMEDIAL ACTION OBJECTIVES

Remedial action objectives are developed for a site to determine the levels to which contaminant concentrations must be reduced to protect human health and the environment. The remedial goals should establish cleanup levels for carcinogens that provide protection within the risk range of 10^{-4} to 10^{-6}, in accordance with the NCP requirements developed by the EPA (40 CFR Section 300.430). An acceptable risk of 10^{-6} has been established for this project. Remedial action objectives are also based on reference doses for compounds, i.e., estimates of the daily chemical exposure doses to which individuals can be exposed without an appreciable risk of noncarcinogenic or systemic health effects over a lifetime of exposure (EPA 1993). To evaluate possible risk from exposure to noncarcinogenic contaminants, a hazard quotient (HQ) is calculated by dividing the exposure dose by the reference dose (RfD):

$$HQ = \frac{\text{Exposure Dose}}{\text{RfD}}$$

If the HQ is less than 1, the contaminant is considered unlikely to pose a health hazard to individuals exposed under the given scenario (EPA 1989). This acceptable risk for noncarcinogens (i.e., HQ less than 1) has also been established for this project.

A human health exposure pathway analysis was prepared for the NCIA off-site groundwater (Chapter 8). A pathway analysis, unlike a risk assessment, determines the significant exposure routes and receptors, but does not calculate the chronic daily intake for the COCs or the final carcinogenic and non-carcinogenic risks. Based on this analysis and a review of the applicable standards, criteria, and guidance (Chapter 7), remedial action objectives were established for contaminants in groundwater.

The remedial action objectives developed for the NCIA off-site groundwater serve to:

- Prevent human exposure (inhalation, ingestion, and dermal contact) to the contaminants in the groundwater plumes, which are contaminated with unacceptable levels of the COCs.

- Prevent further migration of contaminants in groundwater.

For the off-site groundwater, a remedial action objective that was established achieves NYSDEC's Class GA groundwater standards (NYSDEC 1998). Achievement of these objectives is believed to be protective of human health and the environment. Although soil above the water table is not an environmental medium that is contaminated in the off-site area, some response technologies may volatize contaminants from the groundwater to soil phase. Thus, the NYS recommended soil cleanup objectives listed in NYSDEC's TAGM #4046 (NYSDEC 1994) will be used as a guide in determining acceptable levels of residual contaminants in soils following a groundwater remedial action.

The data from the RI demonstrated that the off-site groundwater is contaminated with VOCs. More specifically, varying concentrations of PCE, TCE, 1,1-DCE, 1,2-DCE, 1,1-DCA, 1,2-DCA, and vinyl chloride have been identified in shallow (0 - 64 ft bgs), intermediate (65 - 124 ft bgs), and deep (125 - 200 ft bgs) groundwater.

As stated, a remedial action objective is to achieve NYSDEC's Class GA groundwater standards (NYSDEC 1998) for the groundwater medium. Table 9-1 summarizes these numerical standards as they pertain to the off-site groundwater COCs.

TABLE 9-1

CLEANUP OBJECTIVES FOR GROUNDWATER

New Cassel Industrial Area Off-site Groundwater

Contaminant	Class GA Groundwater Standard [1] [ug/l]
Tetrachloroethene	5 *
Trichloroethylene	5 *
1,2-Dichloroethene (total)	5 *
1,1-Dichloroethene	5 *
1,1-Dichloroethane	5 *
1,2-Dichloroethane	0.6
Vinyl chloride	2

1 - NYSDEC Division of Water Technical and Operational Guidance Series (1.1.1), June 1998.
* - Principal organic contaminant standard applies.
MDL - Method detection limit.
SB - Site background.

The above remedial action objectives were used to estimate the quantities of contaminated off-site groundwater present. The estimated quantity of contaminated media is used as a tool for evaluating potential remedial alternatives, including the alternative's cost-effectiveness. Appendix I provides a summary of the estimated quantity of contaminated off-site groundwater of concern, by plume.

CHAPTER 10

IDENTIFICATION AND SCREENING OF TECHNOLOGIES

10.1 INTRODUCTION

The first step in developing a range of alternatives to achieve the remedial action objectives for the NCIA off-site groundwater is to identify potentially applicable remedial technologies. An initial screening is performed in which the applicability of the identified technologies is evaluated in terms of site conditions, contaminants, and contaminated media characteristics. The most promising technologies are combined into site-wide remedial alternatives (Chapter 11), which are then included in the detailed analysis of alternatives section (Chapter 12) of this report.

10.2 GENERAL RESPONSE ACTIONS

The remedial technologies identified for potential application to the "off-site groundwater," as defined in Chapter 9, are evaluated in this chapter. The focus of the remedial responses will be on groundwater restoration because no contaminated soils were identified at locations downgradient of the NCIA. Some groundwater remedial technologies (e.g., air sparging) transfer contaminants from the saturated to the unsaturated zone in order to remove them from the environment. When discussing these technologies, an appropriate soil remediation technology will be discussed that reduces contaminant concentrations in the unsaturated zone.

Some groundwater remedial technologies generate air emissions containing hazardous constituents. If these emissions contain levels of contaminants that exceed regulatory levels, a control technology would be necessary to reduce contaminant concentrations before the emission is released to the atmosphere. Thus, air emission control technologies are evaluated in this FS to the extent they would be needed to implement the groundwater remedy.

The technologies introduced in this chapter are grouped by impacted media and general response actions. Remedial technologies are separated into two categories: (1) "groundwater responses" represent potentially applicable technologies for remediating off-site groundwater and (2) "air emission controls" represent potentially applicable technologies for controlling contaminants from being emitted to the atmosphere. General response actions place the technologies into categories that represent a particular approach to achieving the remedial action objectives. For instance, for groundwater the general response actions include no further action, institutional measures, containment, collection, in-situ treatment, ex-situ treatment, and disposal.

General response categories are further defined by technology types and process options. Technology types are general categories of technologies (e.g., chemical treatment), while process options are specific processes within each technology type (e.g., chemical treatment via oxidation). This review is not an exhaustive list of all available remediation technologies, but summarizes potentially applicable technologies considered for the NCIA off-site groundwater.

10.3 REMEDIAL TECHNOLOGY SCREENING PROCESS

Tables 10-1 and 10-2 list the groundwater response and air emissions control technologies, respectively, identified for potential utilization for the off-site groundwater. The technologies have been grouped according to the medium they address and by general response action. The initial screening was based on the criteria of effectiveness for treating the contaminated media present at the site, implementability given site-specific constraints, and relative cost. COCs retained for the groundwater medium include PCE, TCE, 1,1-DCE, 1,2-DCE, 1,1-DCA, 1,2-DCA, and vinyl chloride. Groundwater treatment technologies were screened based on their effectiveness in reducing the volume and toxicity of dissolved VOCs. If a given technology is only effective to a certain depth below the surface, it may be applicable for remediating the shallow and/or intermediate aquifer zones but not for remediating the deep aquifer zone. Technologies that have limited effectiveness in intermediate or deeper aquifer zones will be noted.

In Tables 10-1 and 10-2, the technologies that are appropriate for treating the medium-specific contaminants were designated as "Yes" for their applicability to the off-site groundwater. A technology that has a site-specific constraint that would prohibit implementation was screened out of the analysis (i.e., designated as "No"). Some

SUMMARY OF REMEDIAL TECHNOLOGIES FOR GROUNDWATER RESPONSE

New Cassel Industrial Area Off-site Groundwater

GENERAL RESPONSE ACTION	TECHNOLOGY TYPE / PROCESS OPTION	APPLICABILITY TO SITE	SCREENING COMMENTS
No Action	None	Yes	Required by the NCP.
Institutional Measures	A. Development Restrictions	Yes	May be used to prevent human contact with contaminants; will not prevent continued migration of contaminants in the groundwater.
	B. Groundwater Use Restrictions	Yes	Effective in preventing use of contaminated groundwater for potable or process source water.
Containment	A. Capping or surface sealing	No	Installation of a surface cap would not be feasible in this developed area as it would disturb too many properties and meet with strong public opposition. Current land use prohibits the installation of a surface cap.
	B. Barriers	Maybe	Must be tied into a low permeable formation, which does not exist in the off-site area. Difficult to implement at depths of greater than 100 ft below grade. Impractical to implement for deep off-site groundwater contamination (but may be used to contain shallow groundwater during remediation of deeper groundwater).
Collection	A. Groundwater pumping	Yes	Used in conjunction with other remedial actions to extract contaminated groundwater for treatment and disposal. It may also be used to lower the groundwater table (to prevent migration of contaminants), and/or reverse the direction of groundwater flow.
	1. Function a. Extraction	Yes	Effective groundwater and contaminant plume control mechanism. This technology is dependent on aquifer characteristics and plume dimensions. Moderate aquifer transmissivities are desirable.

SUMMARY OF REMEDIAL TECHNOLOGIES FOR GROUNDWATER RESPONSE

New Cassel Industrial Area Off-site Groundwater

GENERAL RESPONSE ACTION	TECHNOLOGY TYPE / PROCESS OPTION	APPLICABILITY TO SITE	SCREENING COMMENTS
Collection (Continued)	2. System Options		
	a. Well points or shallow wells	No	May be used to extract groundwater contamination, but to depths of only about 100 ft bgs. Injection of nutrients/chemicals will likely meet opposition from local agencies and public.
	b. Deep wells	Yes	May be used to extract groundwater to the surface.
	c. Pulsed pumping	Maybe	Innovative technology that encourages diffusion of contaminants from stagnation zones into capture zones while reducing the volume of recovered groundwater. Additional evaluation warranted.
	B. Subsurface collection system	No	Impractical because groundwater is encountered at depths over 50 ft below grade.
In-Situ Treatment	A. Biological	No	A sufficient microbial population is not believed to exist because there are not enough nutrients to sustain bacteria. Addition of chemicals to subsurface may meet with local opposition.
	B. Thermal	No	Energy and cost prohibitive.
	1. Hot water or steam heating enhancement	No	Enhancement technique for vaporization of organic compounds.
	C. Physical/chemical	Yes	Potentially effective in reducing VOC concentrations.
	1. Passive treatment walls	No	Innovative technology for the removal of contaminants via subsurface permeable walls. Saturation of bed materials, plugging with precipitates, and short life of treatment materials make technology suitable primarily for temporary remediation. A low permeability layer to tie in the treatment wall does not exist at a shallow enough depth to make this technology feasible.
	2. Funnel and gate systems	No	Combination of barriers and passive treatment walls. Similar limitations to passive treatment walls.
	3. Bioslurping	No	May not be effective in treating contaminants associated with site.
	4. Hydraulic or pneumatic fracturing	No	Used to increase the permeability of low permeability formations, such as clays, tills, and bedrock, for subsequent in-situ treatment or groundwater extraction, especially for volatile organic contamination. Not applicable to existing site conditions.

SUMMARY OF REMEDIAL TECHNOLOGIES FOR GROUNDWATER RESPONSE

New Cassel Industrial Area Off-site Groundwater

GENERAL RESPONSE ACTION	TECHNOLOGY TYPE / PROCESS OPTION	APPLICABILITY TO SITE	SCREENING COMMENTS
In-Situ Treatment (Continued)	5. Air sparging/SVE	No	Would not be effective in removing contaminants from deeper depths due to site specific geological constraints and the weight of the water column.
	6. Surfactants	No	Enhancement technology for increasing mobility and solubility of organic contaminants to improve pump and treat performance. Injection of materials to the subsurface may meet with local opposition.
	7. Cosolvents	No	Enhancement technology for increasing mobility and solubility of organic contaminants to improve pump and treat performance. Injections of chemicals to the subsurface may meet with local opposition.
	8. Electrokinetic remediation	No	Innovative technology that removes inorganics and some organics through electro-osmosis and ion migration. Application has not been demonstrated extensively; significant bench- and pilot-scale tests would be required. Has been applied mostly for metals.
	9. Dual phase extraction	No	Soil contamination is not a primary concern in the off-site areas making this technology unnecessary.
	10. In-well vapor stripping	Yes	Groundwater extraction costs and permitting issues are reduced. Groundwater is treated in well, not ex-situ. Effective also at deeper depths.
	11. Monitored natural attenuation	Yes	Natural attenuation will reduce contaminant concentrations over time and monitoring will track the fate and transport of contaminants.

SUMMARY OF REMEDIAL TECHNOLOGIES FOR GROUNDWATER RESPONSE

New Cassel Industrial Area Off-site Groundwater

GENERAL RESPONSE ACTION	TECHNOLOGY TYPE / PROCESS OPTION	APPLICABILITY TO SITE	SCREENING COMMENTS
Ex-Situ Treatment	A. Biological	No	Requires more operator attention than other similarly effective treatment technologies. Possibility of fouling.
	B. Thermal	No	Energy and cost intensive; not usually effective for liquid contamination with parts per million concentrations. Administrative difficulties may be met.
	C. Physical	Yes	May be used in conjunction with other processes, as determined by waste characterization and treatability studies.
	1. Flow equalization	Yes	Mixing wastes of different concentrations; effective when combined with other treatment technologies.
	2. Sedimentation	Yes	Effective on particulate-phase contaminants only, such as suspended iron.
	3. Carbon adsorption	Yes	Applicable for effluent polishing. Effective in removing organics (through adsorption). Presumptive treatment technology for treatment of dissolved organic contaminants at CERCLA sites.
	4. Ion exchange	No	Generally effective for removal of inorganic contaminants only.
	5. Reverse osmosis	No	Expensive process in comparison with other treatment technologies. Membrane subject to chemical attack, fouling, and plugging.
	6. Air stripping	Yes	Effective for removal of volatile organics and is commonly applied at hazardous waste sites. Presumptive treatment technology for treatment of dissolved organic contaminants at CERCLA sites.
	7. Ultrafiltration	No	Not necessarily effective for the removal of dissolved parameters. Other inorganics or organics present as suspended or colloidal solids may be removed. Generally not as cost-effective in treatment train as other methods.
	8. Synthetic sorptive resins	No	Effective, but is more suitable for thermally unstable compounds (i.e., explosives).
	9. X-ray	No	Emerging technology breaks down organic contaminants to nontoxic compounds. Commercial demonstration of this technology has not been achieved.

SUMMARY OF REMEDIAL TECHNOLOGIES FOR GROUNDWATER RESPONSE

New Cassel Industrial Area Off-site Groundwater

GENERAL RESPONSE ACTION	TECHNOLOGY TYPE / PROCESS OPTION	APPLICABILITY TO SITE	SCREENING COMMENTS
Ex-Situ Treatment (Continued)	D. Chemical	Yes	May be used in conjunction with other processes, as determined by waste characterization and treatability studies.
	1. Precipitation	Yes	Not effective for removal of organics, but may be needed to pretreat water prior to VOC treatment to remove iron and manganese.
	2. Flocculation/coagulation	Yes	May be needed to pretreat water prior to VOC treatment to remove iron and manganese.
	a. Chemical additives	Yes	Not effective for removal of organics, but may be needed to pretreat water prior to VOC treatment to remove iron and manganese.
	b. Alternating current electrocoagulation	No	Not a proven technology used at hazardous waste sites.
	3. Oxidation	No	May effectively remove halogenated volatiles when combined with other processes. Incomplete oxidation may result in the presence of more toxic constituents (e.g., vinyl chloride). Re-injection to subsurface may not be allowed.
	a. Hydrogen peroxide oxidation	No	Effective for the removal of organics. Re-injection may not be allowed.
	b. Chlorine dioxide oxidation	No	Treats only cyanide; does not remove organics.
	c. Catalytic oxidation	No	May be applicable to removal of organics. Re-injection may not be allowed.
	4. Reduction (sulfur dioxide, sodium bisulfite, sodium metabisulfite, or sodium hydrosulfite)	No	May be effective for removal of halogenated volatiles from wastewaters when combined with other processes. Incomplete oxidation may result in presence of more toxic constituents (e.g., vinyl chloride). Re-injection not allowed.
	5. Neutralization	No	Not effective for removing contaminants but may be necessary as pretreatment for other processes.
	6. Chlorination	No	Treats only cyanide, not effective for organics. May be needed to control bacterial clogging of certain treatment/re-injection components.
	7. UV oxidation	Yes	Maybe effective in removing organics when used with another process. CERCLA presumptive remedy treatment technology for remediation dissolved organic contaminants in groundwater.

SUMMARY OF REMEDIAL TECHNOLOGIES FOR GROUNDWATER RESPONSE

New Cassel Industrial Area Off-site Groundwater

GENERAL RESPONSE ACTION	TECHNOLOGY TYPE / PROCESS OPTION	APPLICABILITY TO SITE	SCREENING COMMENTS
Disposal	A. Off-site treatment and/or disposal	No	Volume of groundwater too large to be cost effective to haul and dispose of.
	1. Publicly owned treatment works (POTW)	No	Discussions with local officials indicate that discharge to the POTW is not an option.
	2. TSDF	No	Pumped groundwater may be transported to a permitted TSDF for treatment and disposal. Not cost-effective for large volumes of contaminated water. Treatment residue may need to be treated prior to disposal.
	B. On-site (Local) Discharge	Yes	Treated effluent could be discharged locally.
	1. Deep well injection	No	Deep well injection not practical because of the underlying sole source aquifer.
	2. Discharge via stormwater system (Seepage basin / Dry well injection)	Yes	Treated effluent would require treatment to meet effluent limitations prior to discharge. Local stormwater collection system may be utilized.
	3. Surface impoundment	No	Liquid wastes could not merely be collected and stored; would require treatment. Does not achieve ultimate disposal goals of SARA. Would require large area that is not available at site.

TABLE 10-2

SUMMARY OF REMEDIAL TECHNOLOGIES FOR AIR EMISSIONS CONTROLS

New Cassel Industrial Area Off-site Groundwater

GENERAL RESPONSE ACTION	TECHNOLOGY TYPE / PROCESS OPTION	APPLICABILITY TO SITE	SCREENING COMMENTS
No Action	None	Yes	The emissions generated from a treatment process may be below standards, in which case no air treatment would be required.
Institutional Measures	Placement restrictions	Yes	Can prevent human contact with contaminants through strategic placement of emission sources.
Containment	A. Dust/particulate control measures	No	Not effective in reducing VOC concentrations in air emissions.
	B. Capping or surface sealing	No	Not effective in reducing VOC concentrations in air emissions from a treatment system.
	C. Vertical barriers	No	Not necessary for gas control alone.
Collection	Gas collection	Yes	Vapor phase contaminants from a treatment system will be collected for treatment.
Treatment	A. Carbon adsorption	Yes	For off-gas treatment from other processes only. Not for direct site control. Spent carbon will require off-site regeneration or disposal.
	B. Catalytic Oxidation	Maybe	For off-gas treatment from other processes only. Not for direct site control. Process generates hydrochloric acid, which may require further treatment.
	C. Photocatalytic Oxidation	Yes	For off-gas treatment from other processes only. Not for direct site control. Particulate matter will need to be removed first.
	D. Gas Absorption	Yes	For off-gas treatment from other processes only. Not for direct site control. Process requires packed towers.

technologies were designated as "Maybe" for their applicability because additional site-specific information is necessary to confirm their effectiveness.

A treatment technology is considered "innovative" if it has no or limited full-scale application at Federal hazardous waste sites. A bench- and/or pilot-scale study may be required if an innovative technology is selected. The use of innovative remedial technologies for the NCIA off-site groundwater is limited by the lack of performance data.

10.3.1 **Groundwater Response**

Groundwater response technologies retained in this screening are those that are capable of remediating chlorinated VOCs in the shallow, intermediate, and deep aquifer zones. The shallow zone is defined as the saturated zone between the water table and 64 ft bgs. The intermediate zone is defined as the saturated zone between 65 and 124 ft bgs. The deeper zone is defined as the saturated zone is between 125 and 200 ft bgs.

Measures for controlling the groundwater contaminant plumes are discussed in the following subsections. General response actions for groundwater response include no action, institutional measures, containment, collection, in-situ treatment, on-site treatment, and disposal.

10.3.1.1 ***No Action.*** The no action option is included as a basis for comparison with active groundwater remedial technologies in accordance with the NCP and New York State hazardous waste regulations (6 NYCRR Part 375). With this no action response, contaminants already in the off-site groundwater will continue to migrate in the direction of groundwater flow and will not be controlled or monitored.

10.3.1.2 ***Institutional Measures.*** Applicable institutional measures include development restrictions, which could be applied to the site and downgradient properties. Development restrictions are intended to prevent human contact with contaminants by restricting the use of contaminated groundwater. They can apply to any new construction initiated by the current property owners. Groundwater use restrictions may be applied to prevent future users of the property and downgradient properties from contacting (e.g., via dermal contact or ingestion) contaminated groundwater either as a potable or process water. For this FS, it is assumed that the Bowling Green Water District will, into the future, continue to remove VOC contamination from the groundwater prior to its distribution to the public water supply. Institutional measures are retained for further consideration in the screening process.

10.3.1.3 ***Containment.*** Capping, or surface sealing, will prevent the infiltration of stormwater thereby minimizing the flow of uncontaminated runoff water into the contaminated groundwater. Capping and surface sealing are unrealistic options for the NCIA off-site groundwater as the contaminant plumes are too large in areal extent, encompassing many properties and rights of way. Therefore, the surface capping and sealing options are screened out of the evaluation.

Vertical or horizontal barriers are another type of technology for containing groundwater contaminants and/or preventing contaminant migration. Generally, their applicability is dependent on site-specific geological conditions. A number of different subsurface barrier options are available for groundwater containment, including vertical barrier placement options and construction materials. Barriers may be placed downgradient from the areas of highest concentration to decrease or prevent the migration of contaminated groundwater into uncontaminated areas. They may also be placed upgradient from the area of highest concentration to decrease or prevent the flow of uncontaminated groundwater into the area of the highest contamination. The most effective method of barrier wall placement is to completely surround the contaminant plume, thereby isolating the area of highest concentration. Vertical barriers typically must be keyed into a low permeability formation (e.g., bedrock or clay layer) to prevent groundwater contaminants from escaping the containment. The use of vertical barriers at the off-site area is not recommended due to the impracticality of containing the contaminant plumes and the absence of a low permeability layer at a reasonable depth. However, it may be possible to use vertical barriers for shallow groundwater containment while using another remedy for deeper groundwater. Horizontal barriers may be installed to form a "floor" beneath the area of highest concentration; this technique is referred to as "bottom sealing." However, construction of a horizontal barrier at depths of over 200 ft below grade and over such a wide area is impractical. For these reasons, vertical and horizontal barriers were screened out of the technology evaluation.

10.3.1.4 ***Collection.*** Groundwater pumping is commonly used to extract contaminated groundwater for subsequent treatment and discharge. Pumping may also be used to lower the water table in specific areas to prevent the migration of contaminants into deeper groundwater and to reduce and/or reverse the direction of groundwater flow. Pumping can be instituted alone or in conjunction with other remedial technologies.

Extraction wells are generally used for plume containment and/or groundwater restoration. Application of this technology is dependent on aquifer characteristics and plume dimensions, as well as extracted groundwater treatment and disposal options. The relatively coarse and unconsolidated nature of the soil is such that hollow stemmed auger drilling could be used to install remediation wells.

Another groundwater pumping system option is an innovative technology called pulsed pumping. An enhancement to the pump and treat technology, pulsed pumping involves the use of a noncontinuous pumping regime to encourage the diffusion of contaminants from stagnation and capillary zones into capture zones while reducing the overall volume of recovered groundwater. Additional evaluation of this technology is necessary to determine its suitability for the off-site groundwater.

Wells can be used to inject nutrients, steam, or hot water, if required by a remedial technology. Gravity fed injection wells are used for shallow contamination and are placed close together so that injected reagents can flow vertically instead of laterally. To enable more lateral flow, gravity fed injection wells are used in conjunction with extraction wells. Pressurized injections are used for deeper wells, where the reagents are released at the bottom of the well. Shallow and/or deep wells may be needed to achieve the remedial objectives. However, because the off-site groundwater is classified as a sole source aquifer, it is likely that injection of any nutrient, steam, or hot water into the ground would meet with public or local opposition. These options have been screened from further discussion.

Subsurface collection systems are effective runoff and groundwater collection mechanisms. These systems act to centralize groundwater collection by increasing hydraulic conductivity locally within the saturated zone, but are generally designed to capture groundwater at shallow depths (less than 20 ft below grade). Off-site groundwater is encountered at depths of over 50 ft below grade making subsurface collection systems impractical to implement. These systems have thus been screened from further analysis.

10.3.1.5 ***In-Situ Treatment.*** In-situ treatment technologies include remedial technologies that treat groundwater contaminants in place without bringing them to the surface (via pumping). These techniques are most effective where the contaminant plume is controllable, well-defined, homogeneous, shallow in depth, and relatively small in areal extent. In-situ groundwater treatment technologies that are potentially applicable to the off-site groundwater include biological, thermal, and physical/chemical treatment processes. Also, monitored natural attenuation is introduced in this section as a potentially viable in-situ technology.

Biological Treatment. Enhanced biodegradation exploits the ability of indigenous or introduced bacteria to biodegrade organic compounds under favorable soil conditions by optimizing such factors as oxygen content, pH, and temperature of the groundwater. Some chlorinated compounds (e.g., PCE and TCE) can be biodegraded in the natural environment, but the rate of degradation is dependent on the type of bacteria and the amount of nutrients that are naturally occurring in the local soil and groundwater. Sometimes this in-situ technology requires the injection of nutrients into the subsurface. Nitrate enhancement has proven to be effective only for gasoline constituents to date. Oxygen enhancement with peroxide is often used in conjunction with pump and treat systems to enhance the rate of biodegradation of organic contaminants by naturally occurring microbes. A sufficient microbial population is not believed to exist to conduct enhanced in-situ bioremediation in the off-site area because there are not enough nutrients to sustain bacteria. Also, the addition of chemical constituents to the off-site groundwater may meet with local regulatory and public opposition because of the presence of sole source aquifers that underlie the site. Therefore, enhanced biological treatment is not evaluated further in this analysis.

Thermal Treatment. In-situ thermal treatment processes strive to enhance the recovery of organic contaminants by volatilization. In this process, hot water or steam is forced into the aquifer via injection wells. Vaporized contaminants rise to the unsaturated zone where they can be removed by vacuum extraction and then treated. Thermal treatment techniques can be used to enhance contaminant recovery, but are not recommended as a primary treatment technology. Thermal treatment technologies are not retained for further consideration in the FS because of the considerably greater cost than other treatment methods. There is an extensive amount of energy (i.e., cost) involved with operating these types of systems.

Physical/Chemical Treatment. Physical and chemical in-situ treatment technologies include passive treatment walls, funnel and gate systems, bioslurping, hydraulic or pneumatic fracturing, air sparging, surfactants, cosolvents, electrokinetics, dual phase extraction, and in-well vapor stripping.

Passive treatment walls are an innovative technology for the removal of contaminants from groundwater by subsurface beds (also known as in-situ reactors) filled with adsorptive or reactive media (e.g., ion-exchange resins or limestone) through which contaminated groundwater flows. Within the adsorptive or reactive media, contaminants are captured and degraded over time. Disadvantages of this technology include saturation of bed materials in a relatively short time and plugging of the bed with precipitates. The system also requires consistent control of pH levels to maintain the effectiveness of the treatment wall. As with vertical barriers, passive treatment walls are usually keyed into a low permeability geologic unit (e.g., bedrock or clay) to prevent groundwater contaminants from passing through the wall untreated. At the off-site area, a low permeability geologic unit does not exist at a reasonable depth. Multiple lengthy permeable walls would be necessary to capture the contaminant plumes and their construction would likely span several properties. Due to the extent and depth of the contaminant plumes, construction and installation of the treatment beds would not be feasible.

A funnel and gate system consists of strategically placed in-situ barriers that direct groundwater flow into passive treatment walls, thereby reducing the size of the treatment wall required. The "gate" part of this treatment system (i.e., the passive treatment wall) is subject to the same limitations as described above. The same limitations expressed for passive treatment walls apply to a funnel and gate system; therefore, both were eliminated from the screening process.

Bioslurping uses technology that combines vacuum-enhanced free-product recovery with bioventing of subsurface soils to simultaneously remediate contaminated groundwater and soils. This technology is best suited toward removing light non-aqueous phase liquid (LNAPL). After the free product has been removed, the system can be converted into a conventional bioventing system. Bioslurping has been screened from further discussions because it treats LNAPLs, not the dissolved chlorinated VOCs that are believed to be present in the groundwater.

Hydraulic or pneumatic fracturing is usually applied to low permeability formations, such as clay, till, and bedrock, to increase permeability. These types of formations are not present in the subsurface and the technology is therefore not necessary.

Air sparging is an in-situ groundwater treatment technology applicable for the removal of VOCs and is applied by forcing compressed air into the subsurface to volatilize the contaminants present. The volatilized contaminants rise to the unsaturated zone where they are captured, usually with a soil vapor extraction (SVE) system, and brought to the surface for treatment. Air emissions generated must be monitored and treated appropriately. Based on the geology of the NCIA off-site area and discussions with vendors of the technology, this technology would not be effective at depths exceeding approximately 85 to 100 ft bgs due to the presence of low permeability clay lenses. Also, because the contaminated groundwater is located at extensive depths (200 ft bgs in some areas), the height and weight of the water column would severely limit the effectiveness of this technology. At this depth, the water pressure restricts the creation of air bubbles and would limit contaminant volatilization. Therefore, air sparging/SVE was screened from the analysis.

Controlled injection of surfactants or cosolvents into the groundwater is an innovative technology that is used to mobilize or dissolve contaminants. The surfactant and cosolvent flushing methods can be used in conjunction with a conventional groundwater pump-and-treat system to increase the removal rate of non-aqueous phase liquids (NAPL) and dissolved contaminant by increasing the apparent solubility of the contaminant and reducing interfacial tension between the water and the NAPL. The successful use of surfactants and cosolvents at hazardous waste sites has not been fully demonstrated. Both surfactants and cosolvents were not retained in the screening process because the injection of any constituents to the subsurface would meet with local opposition because of the presence of the sole source aquifer.

Electrokinetic remediation is an innovative treatment technology that separates and extracts heavy metals and some organic contaminants from saturated soils by applying a low intensity direct current on either side of a contaminated area. The electrical current causes electro-osmosis and ion migration, which moves the aqueous phase contaminants in the subsurface from one electrode to the other. The contaminants are then extracted and placed into a recovery system or deposited at the electrode. The electrokinetic remediation process has only had limited commercial application at hazardous waste sites and has mostly been applied to metal contaminants. It is, therefore, screened from the technology review process.

Dual phase extraction is applied by simultaneously extracting contaminated liquid and soil vapor from low permeability or heterogeneous formations by using a series of vacuum extraction wells screened in the unsaturated and saturated zones. As the vacuum is applied to the well, soil vapor is extracted and groundwater is taken along with the extracted vapors. Once above grade, the extracted vapors and groundwater are separated and treated. Dual phase extraction is generally combined with other technologies (e.g., air sparging or bioventing) that are intended to extract VOCs. Because soil contamination is not the primary concern in the off-site areas, dual phase extraction does not provide any added benefits in comparison to simpler technologies. Thus, further evaluation of the dual phase extraction technology is not necessary.

In-well vapor stripping is similar to dual phase extraction in that it treats groundwater without extracting it, but is usually applied to aquifers with moderate to high hydraulic conductivity. The system consists of two major components: 1) pressurized air flow generation and delivery and 2) vacuum extraction. Specialty wells are placed in the areas of the highest VOC contaminant concentrations and/or in areas to contain contaminant migration. The wells are screened both beneath the water table and in the vadose zone. An air line within the well runs from an aboveground supply and extends below the water table. Pressurized air injected below the water table aerates the water within the well, creating a density gradient between the aerated water and the more dense water in the surrounding aquifer. As a result, dense water flows in to the well through the lower well screen and forces the aerated water upward within the well, while becoming aerated itself. The result is a rising column of aerated water within the well, or an air-lift system. As the aerated groundwater column rises within the well, VOC mass transfer occurs from the dissolved phase to the vapor phase. Above the water table, a packer, or deflector plate, is installed at the upper screen to prevent the passage of rising water or bubbles. The rising water column hits the packer, the bubbles burst and the entrained VOC vapor is stripped off laterally through the screen by an upper vacuum casing. As this technology could feasibly be used to treat the off-site groundwater contamination, it has been retained in the screening process.

Of the in situ physical/chemical treatment technologies, in-well air stripping was retained for further evaluation.

Monitored Natural Attenuation. Monitored natural attenuation (MNA) refers to the remediation technology wherein natural processes that reduce contaminant concentrations in the environment are periodically monitored. Natural attenuation is defined as "naturally occurring processes in the environment that act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in those media". Natural attenuation is an in-situ process that makes use of natural processes to contain the spread of contamination from chemical spills and reduce the concentration and amount of pollutants at contaminated sites. This means that environmental contaminants are left in place while naturally occurring bacteria and other naturally occurring (chemical, physical) phenomena work at degrading them. These in-situ processes include biodegradation, dispersion, dilution, sorption, volatilization, and/or chemical and biochemical stabilization of contaminants. Natural attenuation has been extensively documented and is increasingly relied upon for the cleanup of soils and groundwater contaminated with fuel hydrocarbons, PAHs, and even chlorinated solvents. The term "monitored natural attenuation," or MNA, refers to the method of monitoring the natural processes that reduce contaminant concentrations over time using sampling, analysis, and modeling (if necessary). The MNA technology has been retained for further evaluation.

10.3.1.6 ***Ex-Situ Treatment.*** A wide variety of technologies are available for the treatment of collected groundwater when it is transferred to the surface, including biological, thermal, physical, and chemical methods. The choice of an appropriate treatment technology is dependent on the nature and concentration of the contaminants present as well as the relative cost and effectiveness of each of the technologies. The presence of more than one type of contaminant in the water stream may require the use of more than one process option in a treatment train. A brief discussion is presented below which describes the available process options for treating collected groundwater via biological, thermal, physical, and chemical technologies.

Biological Treatment. Biological treatment technologies that may be applicable to collected groundwater include treatment in an aerobic and anaerobic reactor. Examples of aerobic reactors include activated sludge, trickling filters, and rotating biological contactors. These technologies are generally applicable for the removal of organic constituents (volatile and semi-volatile compounds) only; the presence of heavy metals may inhibit biological treatment. Activated sludge or trickling filters may be used in conjunction with other treatment processes for the removal of metals. The applicability of these processes to treating collected groundwater needs to be determined in a treatability study. Rotating biological contactors can handle relatively low-strength wastes as compared to the activated sludge and trickling filter processes. Anaerobic filters are generally used for pretreatment of strong wastes. There is the possibility that iron fouling and other undesirable circumstances could occur that would be toxic to the selected bacteria. In addition, biological treatment technologies typically require significantly more operator attention than other types of technologies. For these reasons, biological technologies are being screened out of this evaluation.

Thermal Treatment. Thermal treatment technologies may be effective for removing organic constituents from collected groundwater. Appropriate treatment of air emissions is required to remove any volatilized constituents prior to their release into the atmosphere. Thermal treatment units that have the potential to handle liquids include incinerators (e.g., rotary kiln, fluidized or circulating bed, liquid injection, or infrared), wet air oxidation, and molten salt/plasma arc units. Incineration is generally a costly and energy-intensive process and is not generally effective for liquid streams with parts per million (ppm) contaminant concentrations. Wet-air oxidation and molten glass/plasma arc are both innovative treatment technologies that have not yet been commercially demonstrated at hazardous waste sites, therefore, their reliability and effectiveness are unknown. Administrative difficulties, including air emissions permitting requirements and potential public opposition, may make thermal treatment less likely to be implementable than other comparable treatment technologies. For these reasons, none of these thermal technologies have been retained in the screening process.

Physical Treatment. Numerous physical treatment processes are available for removing organic constituents from collected groundwater. Flow equalization (i.e., mixing of waste streams of different strengths) and sedimentation are commonly applied technologies for reducing contaminant concentrations. Sedimentation is a technology that captures settleable solids from a liquid stream. Sedimentation may be required in the effluent treatment process if precipitated compounds must be removed prior to discharge or to prevent equipment fouling. Sedimentation, in the form of clarification, is retained as a feasible technology option. Activated carbon is a commonly used treatment process for removing organics (through adsorption) and metals (through filtration). Granular activated carbon (GAC) adsorption is a presumptive treatment technology for treatment of dissolved organic contaminants in groundwater of CERCLA sites (EPA 1996).

Activated carbon adsorption is also used as an effluent polishing step. Flow equalization, sedimentation, and activated carbon adsorption have been retained for further evaluation.

Ion exchange can remove dissolved metals and radionuclides from an aqueous solution. Oil, grease, and suspended solids may decrease the efficiency of this technology. This technique has not been retained because it does not effectively treat volatile organics, which are the contaminants of concern at the site. Reverse osmosis is a separation process that forces water through a membrane. The water containing the contaminants that was not able to pass through the membrane is recirculated back to a treatment unit where organic vapors are extracted by a vacuum and then are condensed, thereby minimizing air releases. This wastewater is a small fraction of the original amount of water that needs to be treated, but will require off-site disposal. Because the membrane is susceptible to chemical attack and being clogged, and this technology is expensive relative to other technologies, this process is not given further consideration.

Air stripping is a full-scale technology that removes volatile organics from the groundwater by greatly increasing the surface area of the contaminated water that is exposed to the air. Air stripping is a presumptive treatment technology for treatment of dissolved organic contaminants in groundwater of CERCLA sites (EPA 1996). There are many types of aeration techniques that could be utilized (e.g., packed towers, diffused aeration, tray aeration, and spray aeration). This technology has been retained for further study.

Ultrafiltration is a mechanical separation process based on particle size. The particles are separated by forcing liquid through a semipermeable membrane, whereby only the particles that are smaller than the openings in the membrane can fit through. This technology has not been retained because the contaminants of concern at the site are dissolved in the groundwater; there are no particles to be screened out. Further, it is assumed that any solids control that may be needed in the treatment train of a groundwater remedy will employ less costly methods. Synthetic sorptive resins are similar to the carbon adsorption process and can be designed to achieve higher degrees of selectivity and adsorption capacity for certain compounds than activated carbon. The synthetic resin process is more suitable for thermally unstable compounds, such as explosives, and is therefore screened from further discussions. Using x-rays to break down organic contaminants into nontoxic compounds is an emerging technology that has not been commercially demonstrated and is, therefore, not given further consideration in the screening processing.

Of the physical treatment technologies, flow equalization, sedimentation, carbon adsorption, and air stripping have been retained for further evaluation.

Chemical Treatment. Chemical treatment technologies that may be applicable at these sites in conjunction with other processes include precipitation, flocculation/coagulation, oxidation, reduction, neutralization, chlorination, and ultra-violet (UV) light oxidation/ozonation. Both precipitation and flocculation/coagulation with chemical additions have proved effective for the removal of metals, such as iron and manganese. Precipitation may be needed to pretreat the contaminated groundwater for the removal of iron and manganese prior to VOC removal. Flocculation/coagulation may also be conducted using alternating current electrocoagulation, however this is not a commonly used or proven technology at hazardous waste sites. These processes are effective primarily in the removal of inorganics; treatability studies may need to be conducted to evaluate their effectiveness and optimum operating conditions. Precipitation, flocculation, and coagulation are retained as feasible technologies for the pretreatment of the VOC-contaminated groundwater.

Oxidation and reduction may effectively remove inorganics and VOC when combined with other processes. Incomplete oxidation or reduction may result in the presence of more toxic constituents. Oxidation using hydrogen peroxide is effective for the removal of organics only, while chlorine dioxide oxidation and chlorination are effective primarily for cyanide removal and do not remove metals or organics. Catalytic oxidation uses metal oxides (e.g., nickel oxide, copper oxide, manganese dioxide, and chromium oxide) to oxidize VOCs. Oxidation with hydrogen peroxide and catalytic oxidation and reduction processes have been removed from the screening process in this FS because the groundwater is classified as a sole source aquifer and injection of any chemical into the subsurface, which may occur if treated groundwater is re-injected, is not permitted.

Generally, neutralization is not effective for the removal of contaminants, but may be required to meet discharge limitations or as pretreatment for other processes. Chlorination has been shown to treat cyanides, but is not effective for organic removal. UV oxidation may be effective in removing organics when used in conjunction with other processes. UV oxidation is a presumptive treatment technology for treatment of dissolved organic contaminants in groundwater of CERCLA sites (EPA 1996) and is retained for further evaluation. Due to their limitations, neutralization and chlorination have been eliminated from further discussions.

10.3.1.7 ***Disposal.*** Selection of a disposal or discharge option for collected groundwater depends on the quantity of effluent to be disposed, pretreatment/treatment requirements, and regulatory considerations. Groundwater disposal options were divided into off-site and on-site (i.e., local) options, as discussed below.

Off-site Discharge. Off-site facilities that may potentially accept effluent (untreated groundwater) include the local publicly owned treatment works (POTW) or a treatment, storage, or disposal facility (TSDF). Discussions with local officials indicate that discharges to the sanitary sewer system are not permitted. Therefore, discharge to the POTW was eliminated as an option. Off-site disposal of contaminated groundwater at a TSDF would not be feasible because of the large quantity of groundwater that would be transported to the TSDF.

On-site Discharge. On-site, local discharge options include deep well injection, infiltration through recharge basins and/or dry wells (i.e., utilizing local stormwater collection system), or containment in a surface impoundment. On-site discharge would require treatment to meet applicable NYSDEC groundwater quality standards. Deep well injection is not a practical option because of the presence of the sole source aquifer that lies below the off-site area. Effluent may be transferred to a network of recharge basins or dry wells to allow the water to infiltrate the subsurface, but may be limited by the system's capacity. Appropriate permits or permit equivalents would need to be obtained for this disposal option, and pretreatment standards would have to be achieved. Surface impoundments could not be used due to space limitations and the current use of the properties (i.e., residential and institutional) in the area. Also, surface impoundments do not achieve the ultimate disposal goals of the Superfund Amendment and Reauthorization Act (SARA).

10.3.2 Air Emissions Controls

At the NCIA off-site area, the use of air emissions controls should be evaluated and implemented if a groundwater response treatment technology produces air emissions that require control under regulatory requirements. Measures of controlling air emissions are discussed in the following subsections. General response actions for air emissions controls include no action, institutional measures, containment, collection, and treatment.

10.3.2.1 ***No Action.*** The no action option is included as a basis for comparison with active control technologies in accordance with the NCP. In the no action option, air emissions from process equipment are released directly to the atmosphere without being treated. The no action general response has been retained for further comparison.

10.3.2.2 ***Institutional Measures.*** Institutional measures for air emissions controls are intended to reduce the possibility of human contact with contaminants present; however, their effectiveness is limited as they provide a small deterrent to unauthorized access and do not provide protection for workers. Institutional measures, such as distance separation between a treatment system and fence line or greater stack height, are generally used in conjunction with other remedial actions. Institutional measures have been retained in the screening process.

10.3.2.3 ***Containment.*** Containment measures, such as dust/particulate control measures (e.g., water spraying, wind fences or screens, and synthetic dust covers), capping, surface sealing, and vertical barriers would not be effective measures to reduce VOC concentrations in air or control gas migration. Therefore, containment options are not retained for further evaluation.

10.3.2.4 ***Collection.*** Air emissions generated from a groundwater response remedy can be collected in a piping network and transferred to a treatment system and/or to a discharge point. The gas transfer units may include gas extraction wells, collection headers, and vacuum blowers or compressors. Collection methods have been retained for further evaluation.

10.3.2.5 ***Treatment.*** Several technologies exist for treating collected gases or off-gases from other treatment technologies employed including carbon adsorption, catalytic oxidation, photocatalytic oxidation (PCO) treatment, and gas absorption (i.e., wet scrubbing). All four process options are effective in removing gas-phase chlorinated VOC contaminants, but are not designed to remove inorganic compounds, if present. The selection of a particular gas treatment option will depend on the selection of the groundwater response treatment technology, the targeted contaminants to be removed or destroyed, and the relative cost of each technology. For the NCIA off-site groundwater, the air emissions control technology must be capable of reducing low-level VOC concentrations from a remediation unit (e.g., air stripper) to satisfy regulatory requirements.

Carbon adsorption involves a weak bonding of gas molecules, such as vapor phase contaminants, to a solid, such as granular activated carbon (GAC). The forces holding the gas molecules to the solid can be overcome by either the application of heat or the reduction of pressure to regenerate (clean) the carbon. Carbon adsorption is typically conducted in a fixed-bed adsorption system.

Catalytic oxidation is a VOC incineration method that provides thermal destruction of contaminants at relatively low temperatures and has proven to be effective with many dilute VOC-contaminated air emissions. The gases are heated by a burner, then passed through a catalyst bed. The catalyst is usually a noble metal, such as palladium or platinum, deposited on an alumina support in a configuration to give minimum pressure drop. Catalyst activity may be negatively affected by the presence of chlorine or sulfur in treated air emissions. Treatment of chlorinated VOCs will result in the generation of hydrogen chloride, which may require further treatment.

Photocatalytic Oxidation (PCO) is a destructive process for the treatment of gas-phase waste streams. It is best suited for treating waste streams with contaminant concentrations of 1000 ppm of less, and with low to medium flow rates of less than 20,000 cubic feet per minute. This technology is applicable to chlorinated solvents such as TCA, TCE, and PCE. The PCO technology utilizes a titanium compound catalyst, usually titanium dioxide (TiO_2), and near-ultraviolet light to contact a continuously flowing contaminated air stream. PCO causes significant reaction rates to occur at or near room temperature and it is energy efficient. An advantage of the PCO technology is that it does not require reloading with expensive metal, as the catalyst does not foul readily. Unlike catalytic oxidation, hydrogen peroxide is not generated in the process. The process requires both oxygen and water, and particulate matter must be removed first so that it does not foul the catalyst.

Gas absorption refers to the selective transfer of contaminants from a gas to a contacting liquid, such as water. The separation principle involved is the preferential solubility of a gaseous component in the liquid. Gas absorption is usually carried out in packed towers. The gas stream enters the bottom of the column and passes upward through a wetted packed bed. The liquid enters the top of the column and is uniformly distributed over the column packing, which can have any number of commercially available geometric shapes designed to give maximum gas-liquid contact and have a low gas-phase pressure drop.

Carbon adsorption, catalytic oxidation, PCO, and gas absorption are all retained for further analysis.

10.4 EVALUATION OF TECHNOLOGIES AND SELECTION OF REPRESENTATIVE TECHNOLOGIES

Tables 10-3 and 10-4 indicate the technologies that successfully passed the technology screening process (i.e., those technologies listed as "yes" or "maybe" in their applicability to the site) and were considered for further evaluation in this FS. These technologies were considered for inclusion in the remedial alternatives based on their applicability to site conditions and expected effectiveness. Technologies that were not expected to be effective in treating the COCs were screened out, as shown in Tables 10-1 and 10-2. If a technology cannot be implemented due to a particular logistical constraint or if its cost is relatively high compared to other technologies, it was also eliminated from further discussion.

10.4.1 Remaining Groundwater Response Technologies

The groundwater remedial technologies that were retained following the technology screening process are summarized below, separated by general response action (Table 10-3).

10.4.1.1 ***No Action.*** Although no action does not address the contamination present in the off-site groundwater through remedial measures, it has been retained for comparison with other options in accordance with the NCP.

10.4.1.2 ***Institutional Measures.*** In the institutional measures category, development and groundwater use restrictions were retained as feasible institutional controls to minimize human exposure with contaminants remaining in the groundwater. These have been retained because of their low cost, ease of implementation, and effectiveness, assuming that the restrictions are enforced over time. Institutional measures may be

TABLE 10-3

GROUNDWATER RESPONSE TECHNOLOGIES RETAINED

New Cassel Industrial Site Off-site Groundwater

GENERAL RESPONSE ACTION	TECHNOLOGY TYPE / PROCESS OPTION
No Further Action	No further action
Institutional Measures	A. Development Restrictions B. Groundwater Use Restrictions
Containment	None retained
Collection	Groundwater pumping 1. Function Extraction
In situ Treatment	Physical/chemical 1. In-well vapor stripping 2 Monitored natural attenuation
Ex situ Treatment	Physical 1. Carbon adsorption 2. Air stripping
Disposal	On-site Discharge 1. Seepage basin / Wet well infiltration

TABLE 10-4

AIR EMISSIONS CONTROL TECHNOLOGIES RETAINED

New Cassel Industrial Area Off-site Groundwater

GENERAL RESPONSE ACTION	TECHNOLOGY TYPE / PROCESS OPTION
No Action	None
Institutional Measures	Placement restrictions
Containment	None
Collection	Collection of contaminated vapor phase
Treatment	Granular activated carbon

selected as part of a remedial alternative. For this FS, it is assumed that the Bowling Green Water District will, into the future, continue to remove VOC contamination from the groundwater prior to its distribution to the public water supply.

10.4.1.3 ***Containment.*** No containment technologies were retained as groundwater response controls largely because their implementations are impractical.

10.4.1.4 ***Collection.*** Of the groundwater collection technologies, extraction wells have been retained for further discussion. Groundwater pumping via extraction wells has been proven to be an effective contaminant plume control mechanism.

10.4.1.5 ***In-Situ Treatment.*** Only one active in-situ treatment technology was retained: in-well vapor stripping. Other active technologies are not likely to be effective at depths of 100 to 200 ft below grade. In this category, monitored natural attenuation was also retained for further evaluation.

10.4.1.6 ***Ex-Situ Treatment.*** Two physical technologies, carbon adsorption and air stripping, were retained for further evaluation. Flow equalization and sedimentation were retained for possible use in groundwater remedy treatment trains to remove inorganics and organics from liquids prior to VOC treatment or groundwater discharge. No chemical ex-situ treatments were retained for VOC treatment; however, precipitation, flocculation, and coagulation may be needed to pretreat the contaminated groundwater prior to VOC removal unit processes. UV oxidation can be used to reduce VOC levels in the liquid phase, but it is assumed for purposes of this FS that liquid phase VOC treatment will not be the focus of the groundwater remedy.

Carbon adsorption was retained since polishing of effluent water from a treatment system may be required prior to discharge. For these purposes, GAC was determined to be more cost-effective than UV oxidation.

10.4.1.7 ***Disposal.*** No off-site treatment and disposal options were retained. Feasible local discharge options include the use of the existing stormwater collection system (e.g., a retention basin) or seepage basins/wet wells to allow for infiltration. Contaminant concentrations in the effluent would need to satisfy applicable regulatory requirements.

10.4.2 **Remaining Air Emissions Control Technologies**

Air emissions control technologies that were retained following the screening evaluation are summarized below and listed in Table 10-4. Air emissions controls may be needed to meet state and Federal air discharge requirements if a remediation process generates an air emission.

The no action and institutional measures options were retained in the evaluation for the case where no air emissions controls are required for the selected remediation process. If controls are necessary, options include containment, collection, or treatment. For dust controls resulting from excavation activities, containment technologies (e.g., water spraying, wind fences, and dust covers) were retained for potential use.

Carbon adsorption (GAC) was selected for this FS as the treatment technology to reduce VOC concentrations in an air stream. The selection of this technology for a particular application (i.e., in-well vapor stripping or groundwater extraction/air stripping) was based on anticipated flow rates, contaminant concentrations, and operating periods. GAC was also determined to be cost-effective when compared to the other treatment technologies (catalytic oxidation, photocatalytic oxidation, and gas absorption). As described in Chapter 11, these other treatment technologies may need to be further evaluated for particular groundwater remedies based on pilot tests and system monitoring.

CHAPTER 11

DEVELOPMENT AND SCREENING OF REMEDIAL ALTERNATIVES

11.1 INTRODUCTION

In accordance with NYSDEC's TAGMs HWR-89-4025, Guidelines for Remedial Investigations/Feasibility Studies (NYSDEC 1989), and HWR-90-4030, Selection of Remedial Actions at Inactive Hazardous Waste Disposal Sites (NYSDEC 1990), preliminary remedial alternatives for a site are developed by combining the remedial technologies that have successfully passed the screening stage into a range of alternatives. The goal of the screening process is to reduce the number of alternatives that will be included for subsequent detailed analysis by identifying those that are most compatible with the conditions of the site.

Chapter 10 identified and screened the available remedial technologies for treating the contaminated NCIA off-site groundwater. Based on the relatively small number of potentially applicable technologies and existing constraints, the development and formal evaluation of a wide range of unlikely preliminary alternatives was unnecessary. Instead, a group of remedial alternatives that appeared most feasible and appropriate for the off-site groundwater contamination was developed for detailed evaluation. This chapter presents these remedial alternatives developed to address the NCIA off-site groundwater contamination, as defined in Chapter 9.

As stated in previous chapters, this FS is based on the presumption that the selected remediation at source sites within the NCIA will be implemented. Further, it is assumed that additional groundwater remedies will be implemented as RI/FSs are completed at other sites within the NCIA. Summaries of active groundwater remediation that is either in-place at or selected for the individual sites within the NCIA are provided below and in Figure 11-1. Currently, there are 13 individual sites within the NCIA that are listed as Class 2 sites on the NYSDEC Registry.

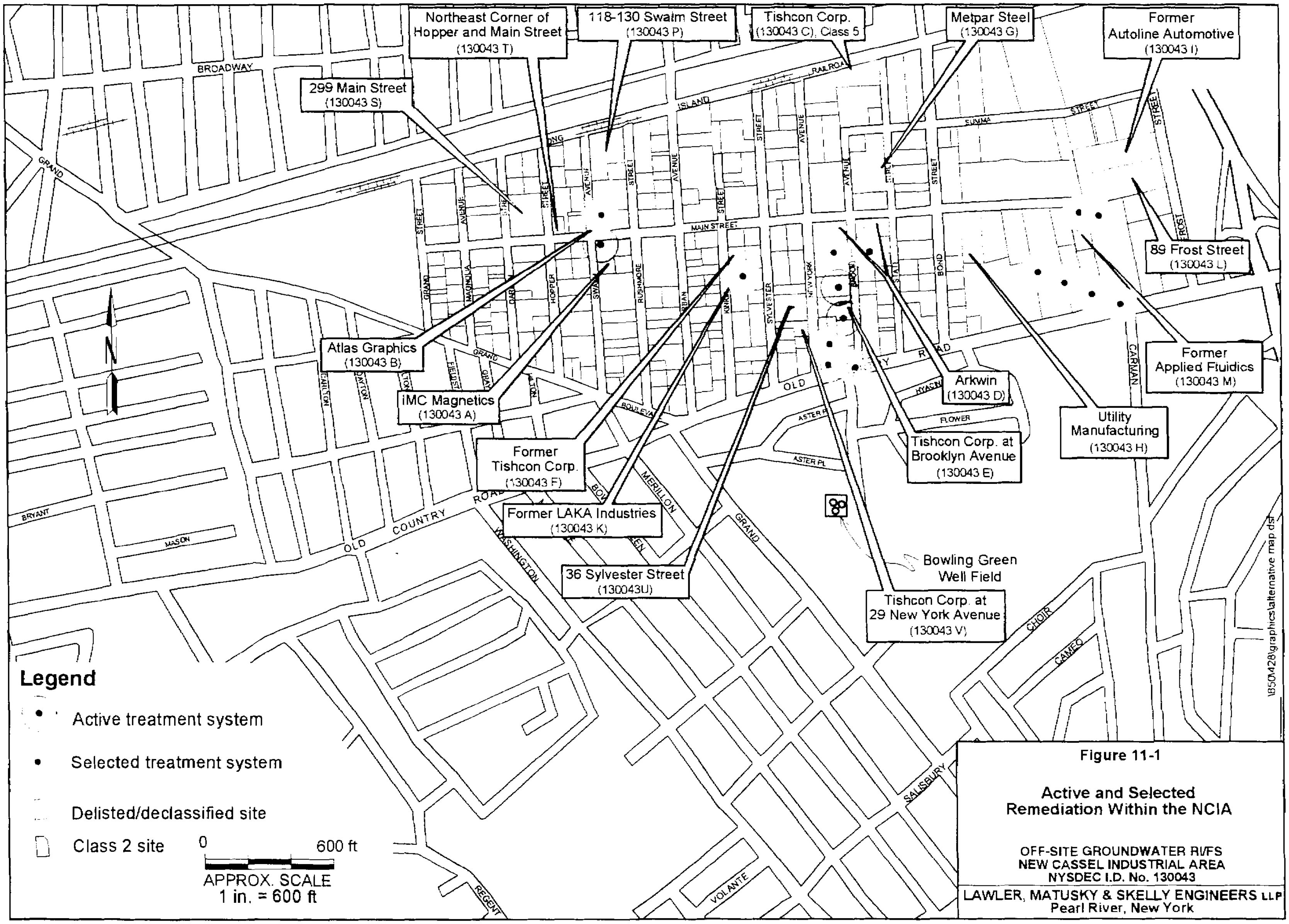


Figure 11-1

Active and Selected Remediation Within the NCIA

OFF-SITE GROUNDWATER RI/FS
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

11.1.1 **IMC Magnetics (Site No. 1-30-043A)**

Remedial History. This site is located at 570 Main Street within the western groundwater plume area and was listed on the Registry as a Class 2 site in 1995. Further investigations on this site revealed that the soils and groundwater were contaminated with chlorinated VOCs. In October 1997, IMC began to operate a SVE system at the site as an interim remedial measure (IRM) to remediate the on-site soil contamination. SVE was subsequently selected as the final soil remedy. A focused groundwater RI/FS at this site confirmed the presence of an on-site chlorinated VOC groundwater plume. The active groundwater remediation at this site will include in-situ oxidation (hydrogen peroxide injection) to oxidize the contaminants. The ROD for the groundwater remediation was issued by NYSDEC in March 2000.

11.1.2 **Atlas Graphics (Site No. 1-30-043B)**

Remedial History. This site is located at 567 Main Street within the western groundwater plume area and was listed on the Registry as a Class 2 site in 1995. The analytical results for this site indicated that elevated levels of TCE were found on-site in both the soil and groundwater. The ROD for this site, issued in February 2000, selected air sparging/soil vapor extraction (AS/SVE) as the remedy to address the on-site contaminated soils and groundwater. Design and construction of the system is likely to proceed during the later half of 2000.

11.1.3 **Arkwin Industries (Site No. 1-30-043D)**

Remedial History. This site includes a number of individual lots located along Main Street within the central groundwater plume area. Based on the presence of chlorinated VOCs and petroleum hydrocarbons in the soils and groundwater at the site, the Arkwin site was added to the Registry as a Class 2 site in 1995. The contaminated soil was excavated in June 1997 as part of an IRM. A focused RI/FS for the groundwater (O.U. 2) was subsequently conducted. The RI results indicated the presence of several VOCs and their breakdown products above the groundwater standard in both the UGA and the Magothy aquifer. The focused FS evaluated a number of remedial alternatives for the groundwater. Based on the FS, NYSDEC selected AS/SVE as the remedy for the groundwater. The ROD for O.U. 2 was issued in December 1999.

11.1.4 **Tishcon Corporation at Brooklyn Avenue (Site No. 1-30-043E)**

Remedial History. This site is located at 30-36 New York Avenue and 30-33 Brooklyn Avenue within the central groundwater plume area. Based on information obtained from a NCIA-wide PSA, Tishcon was added to the Registry as a Class 2 site in 1995. Sampling results showed high levels of chlorinated VOCs (including 1,1,1-TCA) in the soils and groundwater. An IRM, completed in November 1997, removed the soil contamination in an out-of-service cesspool, a sealed storm drain, and an exterior floor drain. A ROD was issued by NYSDEC in January 1998; the ROD also required the installation of an AS/SVE system to address any remaining on-site soil and groundwater contamination. Construction of the on-site AS/SVE system was completed in December 1999, and system operation began in January 2000. To date the system is performing at or above specifications. A focused off-site groundwater RI/FS was finalized in September 1999. The selected remedy consists of the installation of an AS/SVE system to remove the VOC contamination in the off-site groundwater near Old Country Road. The ROD was issued in March 2000.

11.1.5 **Utility Manufacturing/Wonder King Site (Site No. 1-30-043H)**

Remedial History. The Utility Manufacturing/Wonder King site (Utility site) is located at 700-712 Main Street near the eastern plume area. An NYSDEC monitoring well sampling program and a PSA confirmed that soil and groundwater were contaminated with PCE and other related VOCs above standards and guidelines. Consequently, the NYSDEC listed the Utility site as a Class 2 site in March 1996. A subsequent field investigation was completed in May 1998 and included the collection of soil samples and installation and sampling of monitoring wells. The NYSDEC required Utility to conduct an additional investigation to delineate the on-site groundwater contamination and perform an IRM to remediate the on-site groundwater. To date, no final PRAP or ROD has been prepared for the site.

11.1.6 **Former LAKA Industries, Inc. (Site No. 1-30-043K)**

Remedial History. The former LAKA site is located at 62 Kinkel Street which is within the central groundwater plume area. A focused RI/FS was conducted to define the nature and extent of contamination at the site. The RI (finalized May 1999) confirmed that contamination exists in the vicinity of an on-site cesspool and that an additional source area exists in a catch basin located downgradient of the site. NYSDEC prepared the PRAP in September 1999 and issued the ROD in February 2000. The selected remedy consists of excavation of the abandoned cesspool and removal of the contaminated sediments from the catch basin. On-site groundwater quality will continue to be monitored for two more years to measure improvements after the sources are removed.

11.1.7 **Frost Street sites: Former Autoline Automotive (Site No. 1-30-043I); 89 Frost Street (Site No. 1-30-043L); and Former Applied Fluidics (Site No. 1-30-043M)**

Remedial History. The Frost Street sites include three adjacent sites which are located at 89 Frost, 101 Frost Street, and 770 Main Street. The three sites appear to be the origin of the eastern groundwater plume. Based on the results of a PSA that included the installation of soil and groundwater probes, the NYSDEC designated the sites as Class 2 sites in March 1996.

In 1998, a RI/FS was conducted at the Frost Street sites. The RI report was finalized in August 1999 and the investigation determined that the VOC contaminants of concern were PCE, TCE, and xylene. Based on the FS, NYSDEC prepared the PRAPs in January 2000 that described the recommended remedies for the soils at the three sites. The remedies consist of the excavation and disposal off-site of the surficial soils from hot spots, removal of contaminated soil and sediment from ten on-site dry wells, and treatment of deep soil contamination with a SVE system. The RODs were signed in March 2000.

The groundwater contamination was addressed as a combined operable unit since the contamination emanating from the three Frost Street sites co-mingles, such that the contamination from one site mixes with the contamination from an adjacent site forming a common plume of VOC contamination. Based on the FS, NYSDEC prepared the PRAP that consists of the installation of an AS/SVE system to address VOC contamination in the groundwater source areas and an in-well vapor stripping system to address the deeper contamination including areas along Old Country Road. The ROD was signed in March 2000.

11.1.8 **118-130 Swalm Street Site (Site No. 1-30-043P)**

Remedial History. A PSA conducted in 1995 identified the 118-130 Swalm Street site as a potential ("P") site. Further investigations identified the site as a source for the western plume area, and the site was listed on the Registry as a Class 2 site in 1997. The NYSDEC negotiated a Consent Order with the property owner in October 1998 to conduct an RI/FS and IRM of the site. Field work was completed in January 1999. RI results indicated low levels of VOC contamination in on-site cesspools and that the groundwater contamination had decreased over time. Additional investigative work in the cesspools is currently underway. To date, no PRAP or ROD has been prepared on the site.

11.1.9 **299 Main Street Site (Site No. 1-30-043S)**

Remedial History. Based on several phases of sampling and analysis of the soils and groundwater at this site, the NYSDEC listed the 299 Main Street site on the Registry as a Class 2 site in 1997. A Consent Order was negotiated in May 1999 between NYSDEC and the owner to conduct a focused RI/FS. Field work was completed in October 1999, and a draft focused RI report was submitted which indicated the soils and groundwater at the site were contaminated with chlorinated compounds. Additional characterization work and interim remedial measures are scheduled for the Fall of 2000. To date, no PRAP or ROD has been prepared for the site.

11.1.10 **36 Sylvester Street Site (Site No. 1-30-043U)**

Remedial History. The results of the PSA indicated that past site operations have contaminated the groundwater beneath and downgradient of the site with 1,1,1-TCA. NYSDEC listed the 36 Sylvester Street site as a Class 2 site on the Registry in September 1999. NYSDEC has negotiated a Consent Order with the PRP to conduct a RI/FS in 2000. This site is within the central plume area west of the Tishcon Corporation at Brooklyn Avenue site (Site No.1-30-043E) and north of the Tishcon Corporation site at 29 New York Avenue (Site No. 1-30-043V).

11.1.11 **Tishcon Corporation Site at 29 New York Avenue (Site No. 1-30-043V)**

Remedial History. Based on the results of an initial NCIA-wide PSA, this site was listed on the Registry as a Class 2 site in 1995 as part of the Tishcon Corporation at Brooklyn Avenue site. The 29 New York Avenue site was investigated further as part of another PSA conducted in 1996. A soil/sediment sample from an on-site catch basin had TCA-related compounds above cleanup guidelines; it also exhibited a high concentration of vitamin E. Based on these results, the NYSDEC placed the Tishcon Corporation at 29 New York Avenue site as a separate Class 2 site on the Registry in March 1998. This site is also within the central plume area. A Consent Order was negotiated between NYSDEC and the property owner in March 1999 to conduct an RI/FS and IRM on the site. The RI report was received by NYSDEC in December 1999. A proposal to conduct an IRM has also been received from the property owner's consultant.

11.2 **REGULATORY REQUIREMENTS**

New York State hazardous waste regulations and the NCP include requirements for the development of remedial alternatives to ensure that the alternatives selected will provide decision-makers with an appropriate range of options, as well as sufficient information to compare the alternatives. The range of options depends on the site-specific conditions but, to the extent possible, the development of one or more alternatives in each of the following categories is recommended:

1. The no or minimal action alternative.

2. A range of alternatives that includes treatment to reduce the toxicity, mobility, or volume of contaminants present, including:

    a. An alternative that removes or destroys contaminants to the maximum extent possible and minimizes the need for long-term management of remaining wastes or waste treatment residuals.

b. One or more alternatives that vary in the degree of treatment and long-term management required.

c. An alternative that involves little or no treatment but protects human health and the environment through containment or institutional controls to prevent exposure to hazardous materials.

3. A range of alternatives that achieve the contaminant-specific remedial action levels within different time periods.

4. One or more innovative treatment technologies, if any such technologies appear promising (i.e., comparable or superior performance for lower cost).

The development and selection of a final range of remedial alternatives which addresses the New York State and NCP requirements of feasibility studies are developed in this chapter. Eleven alternatives were developed for detailed evaluation.

11.3 DEVELOPMENT OF REMEDIAL ALTERNATIVES

Table 10-3 in Chapter 10 indicates the groundwater response technologies that successfully passed the screening. These technologies were considered for inclusion in the remedial alternatives based on their applicability to local conditions and expected effectiveness on reducing groundwater contaminant concentrations in a reasonable time frame. Technologies that were retained but not subsequently incorporated into alternatives may be substituted for any technology that proves to be ineffective following a bench or pilot scale study.

Eleven groundwater response alternatives were selected for inclusion in the detailed evaluation of alternatives. The technical elements of each are summarized in Table 11-1. This chapter provides a detailed description of the eleven selected groundwater response alternatives. Chapter 12 presents the evaluation of these alternatives against the criteria of protection of human health and the environment; compliance with state and Federal SCGs; short-term impacts and effectiveness; long-term impacts, effectiveness, and permanence; reduction of toxicity, mobility, or volume; implementability; and cost.

TABLE 11-1

REMEDIAL ALTERNATIVES FOR DETAILED EVALUATION

New Cassel Industrial Area Off-site Groundwater

ALTERNATIVE	GENERAL RESPONSE ACTION/TECHNOLOGY TYPE
ALTERNATIVE 1: No Further Action	• Development and groundwater use restrictions • Operation and maintenance of VOC treatment at Bowling Green Water District
ALTERNATIVE 2: Monitored Natural Attenuation	• Development and groundwater use restrictions • Baseline site characterization • Long-term groundwater monitoring to measure the fate and transport of contaminants • Operation and maintenance of VOC treatment at Bowling Green Water District
ALTERNATIVE 3: Monitoring, Assessment and Contingent Remediation	• Development and groundwater use restrictions • Long-term groundwater monitoring to measure the fate and transport of contaminants • Periodic data reduction and maintenance • Technical data and remedial alternative evaluation after each year • Operation and maintenance of VOC treatment at Bowling Green Water District
ALTERNATIVE 4A: Remediation of Upper Portion of Aquifer (to 125 ft bgs) with In-Well Vapor Stripping / Localized Delivery and Vapor Treatment	• In-well groundwater circulation system addressing contamination in upper portion of aquifer • Localized air delivery systems • Vapor collection at wellheads • Localized vapor treatment systems • Air emissions control (GAC) • System performance monitoring • Operation and maintenance of VOC treatment at Bowling Green Water District
ALTERNATIVE 4B: Remediation of Upper Portion of Aquifer (to 125 ft bgs) with Groundwater Extraction / Centralized Air Stripping and Vapor Treatment / Effluent Re-Injection	• Groundwater extraction wells addressing contamination in upper portion of aquifer • Groundwater transfer to central treatment system • Pretreatment of influent • Air stripping of liquid phase VOCs • Sludge generation and off-site disposal • Central air emissions control (GAC) • Central injection of treated effluent • System performance monitoring • Operation and maintenance of VOC treatment at Bowling Green Water District
ALTERNATIVE 5A: Remediation of Upper and Deep Portions of Aquifer (to 200 ft bgs) with In-Well Vapor Stripping / Localized Delivery and Vapor Treatment	• In-well groundwater circulation system addressing contamination in upper and deep portions of aquifer • Localized air delivery systems • Vapor collection at wellheads • Localized vapor treatment systems • Air emissions control (GAC) • System performance monitoring • Operation and maintenance of VOC treatment at Bowling Green Water District

TABLE 11-1

REMEDIAL ALTERNATIVES FOR DETAILED EVALUATION

New Cassel Industrial Area Off-site Groundwater

ALTERNATIVE	GENERAL RESPONSE ACTION/TECHNOLOGY TYPE
ALTERNATIVE 5B: Remediation of Upper and Deep Portions of Aquifer (to 200 ft bgs) with Groundwater Extraction / Centralized Air Stripping and Vapor Treatment / Effluent Re-Injection	• Groundwater extraction wells addressing contamination in upper and deep portions of aquifer • Groundwater transfer to central treatment system • Pretreatment of influent • Air stripping of liquid phase VOCs • Sludge generation and off-site disposal • Central air emissions control (GAC) • Central injection of treated effluent • System performance monitoring • Operation and maintenance of VOC treatment at Bowling Green Water District
ALTERNATIVE 6A: Full Plume Remediation of Upper Portion of Aquifer (to 125 ft bgs) with In-Well Vapor Stripping / Localized Delivery and Vapor Treatment	• In-well groundwater circulation system addressing contamination in upper portion of aquifer (full plume remediation to 125 ft bgs) • Localized air delivery systems • Vapor collection at wellheads • Localized vapor treatment systems • Air emissions control (GAC) • System performance monitoring • Operation and maintenance of VOC treatment at Bowling Green Water District
ALTERNATIVE 6B: Full Plume Remediation of Upper Portion of Aquifer (to 125 ft bgs) with Groundwater Extraction / Centralized Air Stripping and Vapor Treatment / Effluent Re-Injection	• Groundwater extraction wells addressing contamination in upper portion of aquifer (full plume remediation to 125 ft bgs) • Groundwater transfer to central treatment system • Pretreatment of influent • Air stripping of liquid phase VOCs • Sludge generation and off-site disposal • Central air emissions control (GAC) • Central injection of treated effluent • System performance monitoring • Operation and maintenance of VOC treatment at Bowling Green Water District
ALTERNATIVE 7A: Full Plume Remediation of Upper and Deep Portions of Aquifer (to 200 ft bgs) with In-Well Vapor Stripping / Localized Delivery and Vapor Treatment	• In-well groundwater circulation system addressing contamination in upper and deep portions of aquifer (full plume remediation to 200 ft bgs) • Localized air delivery systems • Vapor collection at wellheads • Localized vapor treatment systems • Air emissions control (GAC) • System performance monitoring • Operation and maintenance of VOC treatment at Bowling Green Water District
ALTERNATIVE 7B: Full Plume Remediation of Upper and Deep Portions of Aquifer (to 200 ft bgs) with Groundwater Extraction / Centralized Air Stripping and Vapor Treatment / Effluent Re-Injection	• Groundwater extraction wells addressing contamination in upper and deep portions of aquifer (full plume remediation to 200 ft bgs) • Groundwater transfer to central treatment system • Pretreatment of influent • Air stripping of liquid phase VOCs • Sludge generation and off-site disposal • Central air emissions control (GAC) • Central injection of treated effluent • System performance monitoring • Operation and maintenance of VOC treatment at Bowling Green Water District

The groundwater response alternatives address the off-site groundwater plumes, as previously defined, downgradient of the NCIA. The remediation systems proposed focus on treating the groundwater from the water table (located approximately 55 ft bgs) to 125 ft bgs (Alternatives 4A, 4B, 6A, and 6B) and to 200 ft bgs (Alternatives 5A, 5B, 7A, and 7B) to reduce elevated VOC concentrations in the upper and deep portions of the aquifer and prevent the plume from spreading to further downgradient locations at significant concentrations. The configurations of the off-site groundwater plumes are shown in Figures 9-2 through 9-5.

11.3.1 Alternative 1: No Further Action

Alternative 1 is considered to be the no further action alternative, required by the NCP, because it does not include active treatment of the off-site contaminant plumes. As discussed above, active source removal and groundwater remediation is in-place or planned at 13 source sites within the NCIA. Alternative 1 includes institutional controls in the form of development and groundwater use restrictions. These controls will prohibit the use of groundwater for potable or industrial use. In addition, it is assumed that the Bowling Green Water District will continue to remove VOCs from the groundwater prior to distribution to the water supply system. Groundwater use restrictions will be implemented to prevent development of the underlying groundwater as a potable or a process water source without necessary water quality treatment as determined by NYSDEC. Implementation of development and use restrictions is a method of enforcing groundwater use restrictions.

A 30-yr alternative timeframe has been assumed in order to allow for cost comparisons among the other alternatives. The cost estimate developed for this no further action alternative assumes operation and maintenance, including replacement of equipment as needed, of the VOC treatment processes that are currently in-place at the Bowling Green Water District. The O&M items associated with VOC treatment were developed based on conversations with water district personnel. For this FS, it is assumed that the following equipment utilized in the removal of VOCs from groundwater will be periodically inspected, maintained per manufacturer specification, and replaced (as necessary) over the course of the Alternative 1 project life:

- Air stripping tower (approximate 10 ft diameter; 40 ft height);

    - Structural inspection/maintenance.
    - Periodic cleaning of unit and packing material and inspection for fouling or corrosion.

- Granular activated carbon (GAC) adsorption vessels and associated piping and equipment (six units, each approximately 1200 gallons in volume).
    - Structural inspection/maintenance.
    - Periodic cleaning of units and inspection for fouling or corrosion.

The following O&M items associated with VOC removal were assumed over the lifetime of the alternative, based on current Bowling Green system information:

- Replacement of spent GAC, including off-site disposal or regeneration;
- Inspection of system piping, pumps, meters, and electrical control components;
- Electricity/power costs;
- Inspection of GAC system and air stripping tower (influent/effluent monitoring; wet chemistry) to ensure that VOC removal criteria are being achieved;
- Miscellaneous administrative activities, including maintenance of discharge (effluent water and air emissions) permits, noise control and aesthetics, worker health and safety, and overall system management.

The Alternative 1 cost estimate is included in Chapter 12.

11.3.2 **Alternative 2: Monitored Natural Attenuation**

Alternative 2, monitored natural attenuation (MNA), refers to the reliance on natural attenuation processes to achieve specific remedial objectives within a reasonable time frame. Natural attenuation processes may include a variety of physical, chemical, or biological processes that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, and/or concentration of contaminants in the groundwater. Although MNA does not include an active treatment of the contaminated off-site groundwater, it does include the monitoring and evaluation of natural attenuation processes in the subsurface that can diminish contaminant concentrations in groundwater. As discussed above, active source removal and groundwater remediation is in-place or planned at 13 source sites within the NCIA.

Alternative 2 includes institutional controls (e.g., development, and groundwater use restrictions) to minimize contact with the contaminated groundwater. It is also assumed that the Bowling Green Water District will continue to remove VOCs from the groundwater prior to distribution to the water supply system. Groundwater use restrictions will be implemented to prevent development of the underlying groundwater as a potable or a process water source without the necessary water quality treatments, as determined by NYSDEC. If necessary, development restrictions may be used as a means to implementing groundwater use restrictions. Alternative 2 also includes long-term MNA monitoring to identify any migration or changes in the VOC contaminant plumes.

The in-situ, natural attenuation processes may include biological processes such as aerobic or anaerobic biodegradation; physical phenomena such as dispersion, dilution, sorption, and volatilization; and chemical reactions such as hydrolysis and dehydrohalogenation. Natural attenuation processes typically occur at all sites, but to varying degrees of effectiveness depending on the types and concentrations of contaminants present and the physical, chemical, and biological characteristics of the soil and groundwater. Natural attenuation processes may reduce the potential risk posed by site contaminants in three ways:

1. Transformation of contaminants to less toxic forms through destructive processes such as biodegradation or abiotic transformations;
2. Reduction of contaminant concentrations whereby potential exposure levels may be reduced; and
3. Reduction of contaminant mobility and bioavailability through sorption onto the soil or rock matrix (USEPA 1999).

Where conditions are favorable, natural attenuation processes may reduce contaminant mass or concentration at sufficiently rapid rates to be integrated into a program that addresses contamination at a particular site.

MNA has several potential advantages and disadvantages in remediating contamination. Potential advantages of MNA include:

- Some natural attenuation processes may result in in-situ destruction of contaminants;

- Generation of smaller volumes of remediation wastes, reduced potential for cross-media transfer of contaminants (commonly associated with ex-situ treatment), and reduced risk of human exposure to contaminated media;
- There are no significant space requirements as structures or treatment systems are not typically needed;
- Can be used in conjunction with, or as a follow-up to, other (active) remedial measures; and
- Potentially lower overall remediation costs than those associated with active remediation.

Some potential limitations of MNA include:

- Longer time frames may be required to achieve remediation objectives at a given site, compared to active remediation measures;
- Toxicity and/or mobility of transformation products may exceed those of parent compounds;
- Long-term MNA performance monitoring will generally be costly and can continue for long periods of time; and
- Potential exists for continued contamination migration, and/or cross-media transfer of contaminants.

11.3.2.1 ***Site Characterization.*** Because the ability of natural attenuation as an effective remedial alternative depends on a variety of conditions, the site must be well-characterized to determine if natural attenuation is occurring or will occur in the future. Where MNA is being considered as a remedial approach, certain unique aspects of the site may need to be assessed. For example, to assess the contributions of sorption, dilution, and dispersion to natural attenuation of contaminated groundwater, a detailed understanding of aquifer hydraulics, recharge and discharge areas and volumes, and chemical properties is necessary. Where biodegradation will be assessed, characterization also should include evaluation of the nutrients and electron donors and acceptors present in the groundwater, the concentrations of co-metabolites and metabolic by-products, rates of biological transformations, and possibly specific analyses to identify the microbial populations present. The findings of these, and any other analyses pertinent to characterizing natural attenuation processes, are typically incorporated into the creation of a conceptual model of contaminant fate and transport developed for a site (USEPA 1999).

The conceptual site model is generally used to demonstrate the efficacy of MNA at a site by numerically simulating complex attenuation processes that may occur. Other methods are also employed to evaluate the potential efficacy of MNA as a remedial alternative. For instance, the collection of site-specific data can be used to estimate the rate of attenuation processes and the anticipated time required to achieve remediation objectives. A three-tiered approach to an overall evaluation is becoming more widely practiced and accepted (USEPA 1999). This three-tiered approach includes:

1. Historical groundwater and/or soil chemistry data that demonstrate a clear and meaningful trend of decreasing contaminant mass and/or concentration over time at appropriate monitoring or sampling points.
2. Hydrogeologic and geochemical data that can be used to demonstrate indirectly the type(s) of natural attenuation processes active at the site, and the rate at which such processes will reduce contaminant concentrations to required levels. For example, characterization data may be used to quantify the rates of contaminant sorption, dilution, or volatilization, or to demonstrate and quantify the rates of biological degradation processes occurring at a site.
3. Data from field or microcosm studies which directly demonstrate the occurrence of a particular natural attenuation process at the site and its ability to degrade the contaminants of concern (typically used to demonstrate biological degradation processes only).

For the NCIA off-site groundwater, MNA site characterization data were obtained from the January 2000 groundwater sampling events conducted for the RI. A discussion of these data collection activities is included in Chapter 5 of the RI report. In general, laboratory and field data were gathered, as per EPA guidance, so that the effectiveness of MNA to decrease the VOC parameters of concern could be evaluated. As part of the off-site groundwater MNA characterization, 24 groundwater samples were analyzed for VOCs, arsenic, iron (total), manganese, methane, and ethene by a fixed laboratory. Levels of alkalinity, chloride, dissolved oxygen, conductivity, oxidation-reduction potential (ORP), pH, temperature, hardness, and Fe^{2+} were analyzed in the field.

For this FS, the EPA-endorsed software package BioChlor was used to evaluate MNA in the off-site groundwater. BioChlor was developed to screen natural attenuation as a feasible remediation method for a contaminated site and to mathematically model the selected chlorinated solvents within a groundwater plume. BioChlor includes a natural attenuation screening protocol that awards points and scores a particular site based on site-specific characteristics. In addition, BioChlor mathematically models chlorinated solvents in the groundwater plume based on a sequential, first-order, coupled reactive transport model, and analytically solves the model using the Domenico model. The MNA site characterization data from the January 2000 groundwater sampling event were used as input in the BioChlor software, along with historic groundwater data from the NCIA and vicinity, to evaluate the applicability of MNA as an alternative for the off-site groundwater contamination. Historical data were reviewed in order to fill in data gaps in the MNA characterization. Results of the BioChlor analysis are included in Chapter 12. In general, the software indicated that there is limited-to-adequate evidence for natural attenuation of chlorinated solvents in the off-site groundwater. Information on the software is included in Appendix J.

Although hydraulic conductivity has been estimated at the site based on slug test data, Alternative 2 assumes that an aquifer pump test will be conducted as part of site characterization activities to better determine hydraulic conductivity, hydraulic gradient, and other site-specific hydrogeologic parameters.

11.3.2.2 ***Long-Term MNA Monitoring.*** Performance monitoring to evaluate remedy effectiveness and to ensure protection of human health and the environment is a critical element of all response actions. Performance monitoring is of even greater importance for MNA than for other types of remedies due to the potentially longer remediation timeframes, potential for ongoing contaminant migration, and other uncertainties associated with using MNA.

In general, the monitoring program developed should specify the location, frequency, and type of samples and measurements necessary to evaluate whether natural attenuation processes are performing as expected and are capable of attaining remediation objectives. The monitoring program for the NCIA off-site groundwater should be designed to accomplish the following:

- Demonstrate that natural attenuation is occurring according to expectations;

- Detect changes in environmental conditions (e.g., hydrogeologic, geochemical, microbiological, or other changes) that may reduce the efficacy of any of the natural attenuation processes;
- Identify any potentially toxic and/or mobile transformation products;
- Verify that the plume is not expanding (either downgradient, laterally, or vertically);
- Document any impact to downgradient receptors;
- Detect new releases of contaminants to the environment; and
- Verify attainment of remediation objectives.

The frequency of monitoring should be adequate to detect, in a timely manner, the potential changes in site conditions listed above. At a minimum, the monitoring program should be sufficient to enable a determination of the rate(s) of attenuation and how the rate is changing with time. When determining attenuation rates, the uncertainty in these estimates and the associated implications should be evaluated. Flexibility for adjusting the monitoring frequency over the life of the remedy should also be included in the monitoring plan. For example, it may be appropriate to decrease the monitoring frequency at some point in time, once it has been determined that natural attenuation is progressing as expected and very little change is observed from one sampling round to the next. In contrast, the monitoring frequency may need to be increased if unexpected conditions (e.g., plume migration) are observed. Performance monitoring should continue until remediation objectives have been achieved, and longer if necessary to verify that the site no longer poses a threat to human health or the environment.

During the natural attenuation process, there is the potential for the creation of transformation products that are more toxic than the parent contaminant (e.g., degradation of PCE to vinyl chloride). Additionally, some natural attenuation processes may result in the transfer of some contaminants from one medium to another. Thus, proper monitoring needs to be implemented to assess the formation of more toxic by-products or if cross-media contamination takes place.

The duration of a MNA alternative is determined from natural attenuation evaluation and regulatory requirements. It should be noted that the timeframe required for MNA remedies is often longer than that required for more active remedies. As a consequence, the uncertainty associated with factors used in developing MNA timeframes increases dramatically. Adequate performance evaluation monitoring and contingency remedies may need to be utilized because of this higher level of uncertainty. When determining reasonable timeframes, the uncertainty in the estimations should be considered, as well as the ability to establish performance monitoring programs capable of verifying the timely performance anticipated from natural attenuation.

For the purposes of this FS, the long-term MNA monitoring program is assumed to test for and track the following parameters:

- VOCs (and potential transformation products);
- Total organic carbon (TOC);
- Carbon dioxide (CO_2);
- Electron acceptors (dissolved oxygen, nitrate [NO_3^-], sulfate [SO_4^{2-}], Fe^{2+}, CH_4);
- Alkalinity;
- Redox potential (Eh);
- Chloride; and
- pH, temperature, and conductivity.

VOCs (including potential VOC transformation products), TOC, CO_2, nitrate, sulfate, methane, and chloride, will be analyzed at an analytical laboratory; the remaining parameters listed above will be measured in the field. Following a detailed analysis of the data produced from the January 2000 MNA site characterization program, some of the above-listed parameters may be dropped from the sampling schedule if they are not important to the long-term monitoring program (i.e., if the parameters are not found to be significant indicators of natural attenuation processes).

The purpose of the long-term MNA monitoring program included in this alternative is to monitor any migration and natural attenuation of the on-site contaminant plume. Table 11-2 summarizes the proposed monitoring program for the performance evaluation of natural attenuation at the site. The 14 existing wells included were chosen to provide data from within the shallow, intermediate, and deep portions of the off-site contaminant plumes and from locations within and downgradient of the area of contamination.

TABLE 11-2

ALTERNATIVE 2
MONITORED NATURAL ATTENUATION
LONG-TERM MONITORING PROGRAM SUMMARY [1]
Natural Attenuation Monitoring
NCIA Off-Site Groundwater

WELL[2]	Plume Location	DEPTH [3]	SAMPLING SCHEDULE [4] YEARS 1-5	SAMPLING SCHEDULE [5] YEARS 6-30
N-10477	West	57 ft (shallow)	X	X
N-10478	West	121 ft (intermediate)	X	X
N-11851	West	65 ft (shallow)	X	X
NRMW-4	West	70 ft (intermediate)	X	X
N-11848	West	60 ft (shallow)	X	X
N-11860	Central	60 ft (shallow)	X	X
N-11862	Central	60 ft (shallow)	X	X
N-10476	Central	130 ft (deep)	X	X
N-11861	Central	60 ft (shallow)	X	X
NRMW-1	Central/East	70 ft (intermediate)	X	X
EW-1B	Central/East	164 ft (deep)	X	X
EW-1C	Central/East	516 ft (deep)	X	X
N-9939	Central/East	74 ft (intermediate)	X	X
N-10329	East	57 ft (shallow)	X	X
		TOTAL:	**14**	**14**

X - Sampling is recommended.
- Natural attenuation monitoring entails sampling and analyzing groundwater for the following parameters:
<u>Field Measurements:</u> pH, temperature, conductivity, iron(II), redox potential, dissolved oxygen, and alkalinity.
<u>Laboratory Analyses</u>: VOCs (potential transformation products), total organic carbon, carbon dioxide, nitrate, sulfate, methane, and chloride.

1 - This is a preliminary monitoring program developed for cost estimation purposes; the final monitoring program will be established during the remedial design phase; depending on the sample results, the schedule may be modified.
2 - Well locations are depicted on Figures 3-4, 3-5, and 3-6 of the RI report.
3 - Shallow groundwater exists at depths between the water table and 64-ft; intermediate groundwater exists from approximately 65-124 ft bgs. deep groundwater exists at depths of 125 ft bgs or greater.
4 - All samples will be analyzed for VOCs quarterly.
5 - All samples will be analyzed for VOCs annually.

Table 11-3 lists the 16 existing wells and six new monitoring well couplets selected for long-term monitoring of the VOC contaminant plume. All wells are depicted in Figure 11-2. The dimensions of the plume area and VOC concentrations (e.g., PCE, TCE) in the groundwater will be assessed over time to evaluate the effectiveness of natural attenuation at the site.

A rough time frame of 30 years for the MNA alternative was estimated for the off-site groundwater, considering the maximum concentrations of each of the VOCs detected in the off-site groundwater plumes, half-lives of the contaminants in groundwater (as found in literature reviews), and the assumption that Class GA groundwater standards are to be achieved. This estimation was not considered to be precise since only simple, first-order degradation calculations were made and no modeling was conducted. In addition, the formation of transformation products that would be expected from the degradation of VOCs was not assessed. As the calculation for TCE yielded the longest time period to meet the groundwater standard, it was used to estimate the overall time frame of the MNA alternative. The calculation for TCE is shown below.

TCE: *Initial maximum concentration:* 1800 ug/l
Groundwater standard (assumed remedial objective): 5 ug/l
Average half-life (days): 987 days

Days	Years	Concentration (ug/l)
0	0	1800
987	2.7	900
1974	5.4	450
2961	8.1	225
3948	10.8	112.5
4935	13.5	56.25
5922	16.2	28.13
6909	18.9	14.06
7896	21.6	7.03
8883	24.3	3.51

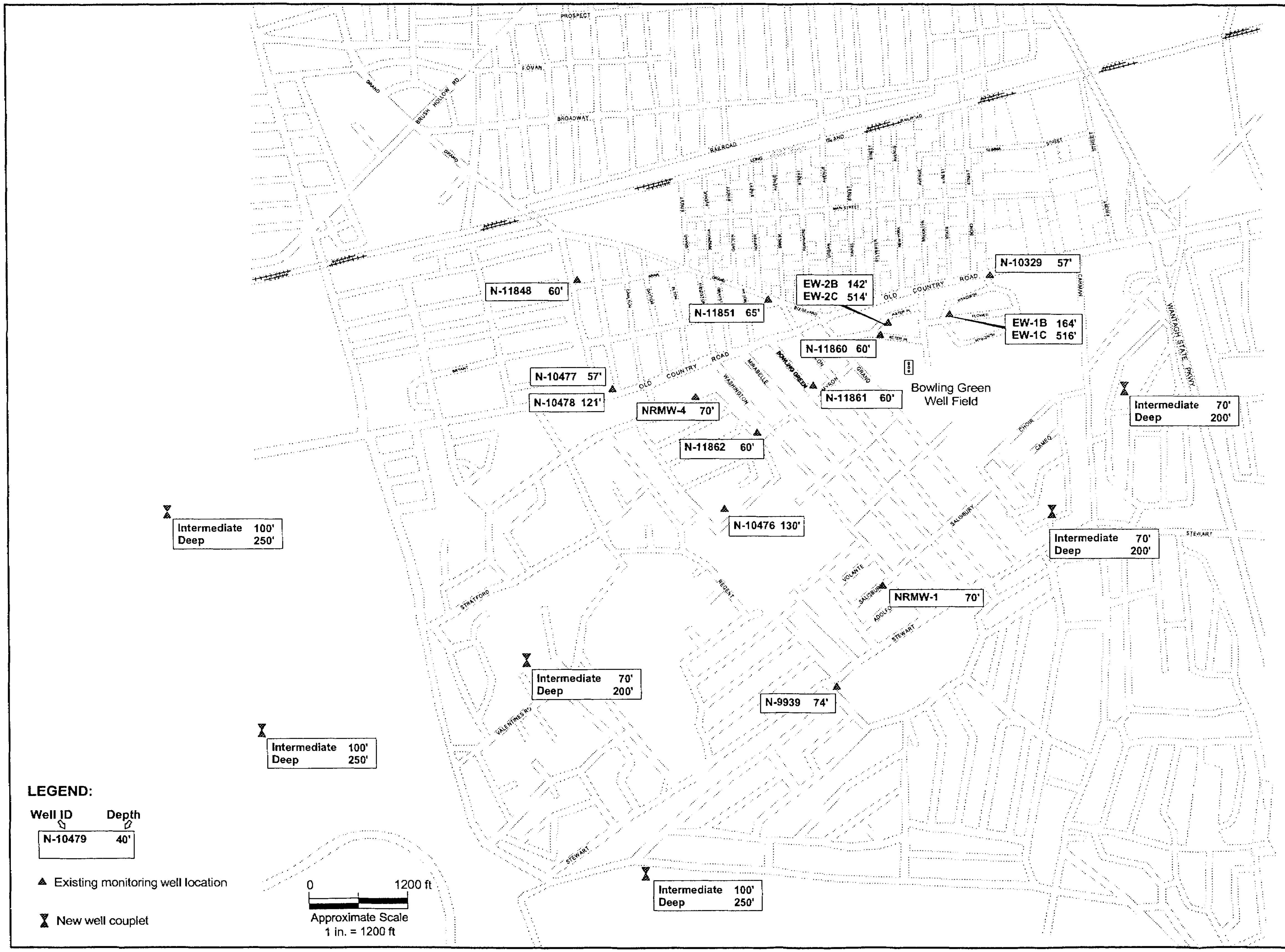


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Figure 11-2

Off-site Groundwater Long-Term Monitoring and Sampling Wells

OFF-SITE GROUNDWATER RI/FS
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

R2-0000561

TABLE 11-3

ALTERNATIVE 2
MONITORED NATURAL ATTENUATION
LONG-TERM MONITORING PROGRAM SUMMARY [1]
Contaminant Plume Monitoring
NCIA Off-Site Groundwater

WELL[2]	Plume Location	DEPTH[3]	SAMPLING SCHEDULE[4] YEARS 1-5	SAMPLING SCHEDULE[5] YEARS 6-30
N-10477	West	57 ft (shallow)	X	X
N-10478	West	121 ft (intermediate)	X	X
N-11851	West	65 ft (shallow)	X	X
NRMW-4	West	70 ft (intermediate)	X	X
N-11848	West	60 ft (shallow)	X	X
N-11860	Central	60 ft (shallow)	X	X
N-11862	Central	60 ft (shallow)	X	X
N-10476	Central	130 ft (deep)	X	X
N-11861	Central	60 ft (shallow)	X	X
EW-1B	Central/East	164 ft (deep)	X	X
EW-1C	Central/East	516 ft (deep)	X	X
EW-2B	Central/East	142 ft (deep)	X	X
EW-2C	Central/East	514 ft (deep)	X	X
NRMW-1	Central/East	70 ft (intermediate)	X	X
N-9939	Central/East	74 ft (intermediate)	X	X
N-10329	East	57 ft (shallow)	X	X
6 proposed new well couplets[6]		**intermediate/deep**	X	X
		TOTAL:	**28**	**28**

X - Sampling is recommended.
1 - This is a preliminary monitoring program developed for cost estimation purposes; the final monitoring program will be established during the remedial design phase; depending on the sample results, the schedule may be modified.
2 - Well locations are depicted on Figures 3-4, 3-5, and 3-6 of the RI report.
3 - Shallow groundwater exists at depths between the water table and 64-ft; intermediate groundwater exists from approximately 65-124 ft bgs. deep groundwater exists at depths of 125 ft bgs or greater.
4 - All samples will be analyzed for VOCs semi-annually.
5 - All samples will be analyzed for VOCs annually.
6 - For costing purposes, it is assumed that 6 new monitoring well locations will be established at locations downgradient and sidegradient of existing off-site plumes to monitor future VOC migration. It is assumed that monitoring wells will be installed at intermediate and deep depths as follows:
   A total of 3 intermediate wells will be installed to 70 ft bgs; the remaining 3 intermediate wells are to be installed to a depth of 100 ft bgs.
   A total of 3 deep wells will be installed to 200 ft bgs, the 3 remaining deep wells are to be installed to a depth of 250 ft bgs.

This estimate is believed to be conservative since the maximum contaminant concentration found in the plumes (1800 ug/l) was retained for the calculation. The chemical-specific half-life values were derived from scientific judgment based on hydrolysis half-life and anaerobic sediment grab sample data (Howard et al, 1991). Based on the findings for TCE, it is assumed (conservatively) that remedial objectives may be obtained in approximately 8,883 days or about 24 years (as a comparison, 1,1-DCE, yielded a time frame of approximately 2 years). An additional six years for a total of 30 was assumed to be conservative in estimating the total time to remediate the off-site plumes; however, the actual remediation timeframe under this alternative may be more than 30 years. The assumption of a 30-yr MNA monitoring program also allowed for cost comparisons among the other alternatives. The natural attenuation monitoring will be conducted on a quarterly basis (to assess possible seasonal fluctuations in subsurface parameters and natural attenuation processes) for the first five years and annually for years 6 through 30. VOC contaminant monitoring will be conducted on a semiannual basis for the first five years and annually from year 6 on. The need for such monitoring programs may be re-evaluated and possibly altered at any time during the 30-year period. For instance, if groundwater contaminant levels remain below the site remedial action objectives for five consecutive years, the monitoring program may be considered for discontinuation. If contaminant levels continue to exceed the remedial action objectives at the end of the 30-yr period, the monitoring program may be extended, or other remedial actions taken. If contaminant levels do not decline during the initial years of MNA, a requirement for additional remediation may be imposed.

Although a 30-yr time frame has been assumed for comparison purposes, a number of factors should be addressed in the detailed final design of the monitoring program to help define what is a reasonable time frame for long-term monitoring of natural attenuation to take place in the off-site groundwater plumes. For example, records of contaminant concentrations over time will be kept and periodically evaluated to monitor trends. Uncertainties regarding the mass of contaminants in the subsurface and predictive analyses (e.g., remediation timeframe, travel time for contaminants to reach downgradient points of exposure appropriate for the area) will be assessed. In addition, factors relating to the affected drinking water resources and institutional controls shall also be monitored. Data can be integrated into a site model to more accurately assess natural attenuation at the site. The final design may also better define the locations and number of wells to be included in the long-term MNA monitoring program.

The cost estimate for this long-term groundwater monitoring program (provided in Chapter 12) assumes replacement of three of the monitoring wells being sampled every five years during the 30 years of monitoring. The replacement cost is necessary because a monitoring well could become plugged, the casing could collapse, or the well could be damaged. Replacement costs of the four "Early Warning" wells (EW-1B, EW-1C, EW-2B, and EW-2C) are not included in the cost estimates. In addition, the cost estimate developed for this alternative assumes operation and maintenance, including replacement of equipment as needed, of the VOC treatment processes that are currently in-place at the Bowling Green Water District (refer to Alternative 1).

11.3.3 **Alternative 3: Monitoring, Assessment, and Contingent Remediation**

As described above, active contaminant source removal and groundwater remediation is in-place or planned at 13 source sites within the NCIA. Alternative 3, Monitoring, Assessment, and Contingent Remediation, combines continued active contaminant source removal and groundwater remediation with a long-term groundwater monitoring program, and a contingency plan to provide for active treatment of the off-site contaminant plumes should the long-term monitoring program show this to be necessary. Alternative 3 also includes institutional controls in the form of development and groundwater use restrictions. In addition, it is assumed that the Bowling Green Water District will continue to remove VOCs from the groundwater prior to distribution to the water supply system. Groundwater use restrictions will be implemented to prevent development of the underlying groundwater as a potable or a process water source without necessary water quality treatment as determined by NYSDEC. Under Alternative 3, groundwater quality as determined by the long-term monitoring program will be reviewed on an annual basis to determine what remediation is required. If it is determined that remediation is required, Alternative 5A: Remediation of Upper and Deep Portions of Aquifer (to 200 ft bgs) with In-Well Vapor Stripping / Localized Vapor Treatment will be implemented.

11.3.3.1 ***Long-Term Groundwater Monitoring.*** The purpose of the long-term groundwater monitoring program included in this alternative is to monitor any migration of the off-site contaminant plumes. Existing monitoring wells selected for the long-term monitoring for Alternative 3 are listed in Table 11-4 and shown in Figure 11-2. In

TABLE 11-4

ALTERNATIVE 3
MONITORING PROGRAM SUMMARY [1]
NCIA Off-Site Groundwater

WELL[2]	Plume Location	DEPTH [3]	SAMPLING SCHEDULE [4] YEARS 1-5	SAMPLING SCHEDULE [5] YEARS 6-30
N-10477	West	57 ft (shallow)	X	X
N-10478	West	121 ft (intermediate)	X	X
N-11851	West	65 ft (shallow)	X	X
NRMW-4	West	70 ft (intermediate)	X	X
N-11848	West	60 ft (shallow)	X	X
N-11860	Central	60 ft (shallow)	X	X
N-11862	Central	60 ft (shallow)	X	X
N-10476	Central	130 ft (deep)	X	X
N-11861	Central	60 ft (shallow)	X	X
EW-1B	Central/East	164 ft (deep)	X	X
EW-1C	Central/East	516 ft (deep)	X	X
EW-2B	Central/East	142 ft (deep)	X	X
EW-2C	Central/East	514 ft (deep)	X	X
NRMW-1	Central/East	70 ft (intermediate)	X	X
N-9939	Central/East	74 ft (intermediate)	X	X
N-10329	East	57 ft (shallow)	X	X
6 proposed new well couplets[6]		***intermediate/deep***	X	X
		TOTAL:	**28**	**28**

X - Sampling is recommended.
1 - This is a preliminary monitoring program developed for cost estimation purposes; the final monitoring program will be established during the remedial design phase; depending on the sample results, the schedule may be modified.
2 - Well locations are depicted on Figures 3-4, 3-5, and 3-6 of the RI report.
3 - Shallow groundwater exists at depths between the water table and 64-ft; intermediate groundwater exists from approximately 65-124 ft bgs. deep groundwater exists at depths of 125 ft bgs or greater.
4 - All samples will be analyzed for VOCs semiannually.
5 - All samples will be analyzed for VOCs annually.
6 - For costing purposes, it is assumed that 6 new monitoring well locations will be established at locations downgradient and sidegradient of existing off-site plumes to monitor future VOC migration. It is assumed that monitoring wells will be installed at intermediate and deep depths as follows:
A total of 3 intermediate wells will be installed to 70 ft bgs; the remaining 3 intermediate wells are to be installed to a depth of 100 ft bgs.
A total of 3 deep wells will be installed to 200 ft bgs; the 3 remaining deep wells are to be installed to a depth of 250 ft bgs

addition, it was assumed that twelve additional wells (i.e., six intermediate and deep well couplets) will also be installed for this alternative for the monitoring program. The monitoring program (developed here for cost estimating purposes) includes a total of 28 monitoring wells (16 existing and 12 new wells ranging in depth from 57 to 516 ft bgs) at locations south of the NCIA. Wells were selected to represent comprehensive (i.e., downgradient of and within the off-site contamination) monitoring of the plume areas and depths. The 16 existing monitoring wells were selected for the long-term monitoring program as they are situated at various locations and depth intervals within the three off-site plumes. The locations of the new intermediate/deep monitoring well couplets will be within and downgradient of the existing off-site plumes, including at locations in the immediate upgradient vicinity of the Bowling Green supply wells.

At the end of every year, a technical assessment of groundwater data will be conducted to determine what remediation is required. Based on those findings of the technical evaluation, the monitoring program will be continued, discontinued, or amended as to number of wells and frequencies of monitoring. Based on the findings from the remedial option assessment, decisions will also be made as to the implementation of active groundwater remediation. If it is determined that remediation is required, Alternative 5A will be implemented. For cost estimating purposes, data reduction/maintenance and technical analyses are considered for the first five years in Alternative 3.

An overall 30-yr monitoring program (as described in Table 11-4) has been assumed for Alternative 3 in order to allow for cost comparisons among the other alternatives. If contaminant levels continue to exceed the remedial action objectives at the end of the 30-yr period, the monitoring program may be extended, or other remedial actions taken. In costing this alternative, it was assumed that the existing monitoring wells and the twelve additional wells noted above will be sufficient to assess the long term effects of the groundwater plume.

Although a 30-yr time frame has been assumed for comparison purposes, a number of factors should be addressed in the detailed design of the monitoring program to help define what is a reasonable time frame for long-term monitoring of the off-site groundwater. For instance, records of contaminant concentrations over time will be kept and evaluated yearly to monitor trends. Uncertainties regarding the mass of contaminants in the subsurface and predictive analyses (e.g., remediation timeframe, travel time for contaminants to reach downgradient points of exposure appropriate for the area) will also be assessed. In addition, factors relating to the affected drinking water resource and institutional controls will also be monitored. The cost estimate for this long-term groundwater monitoring program (provided in Chapter 12) assumes replacement of three of the monitoring wells being sampled every five years during the assumed 30 years of monitoring. The replacement cost is necessary because a monitoring well could become plugged, the casing could collapse, or the well could be damaged. Replacement costs of the four "Early Warning" wells (EW-1B, EW-1C, EW-2B, and EW-2C) are not included in the cost estimates. In addition, the cost estimate developed for this alternative assumes operation and maintenance, including replacement of equipment as needed, of the VOC treatment processes that are currently in-place at the Bowling Green Water District (refer to Alternative 1).

11.3.4 Alternative 4A: Remediation of Upper Portion of Aquifer (to 125 ft bgs) with In-Well Vapor Stripping / Localized Vapor Treatment

Alternative 4A includes remediating the upper portion (i.e., at depths from the water table to 125 ft bgs) of the off-site groundwater contaminant plumes by implementing in-well vapor stripping, an in-situ remediation technology, and localized off-gas treatment. This alternative also includes long-term monitoring of the groundwater plumes. As discussed above, active source removal and groundwater remediation is in-place or planned at 13 source sites within the NCIA.

The reported advantages of using the in-well vapor stripping technology over other methods for remediating contaminated groundwater include:

- Cost savings because there is no need to pump, handle, and treat groundwater at the surface; only contaminated vapor is extracted and treated in this technology.
- System can be designed so that soils in the unsaturated zone do not become incidentally or temporarily contaminated during groundwater remediation.
- Simplicity of design.
- The system can be designed to run continuously with only routine maintenance.

Some limitations reported for this technology include:

- Possible clogging of well screens due to biofouling and precipitation of iron or other nutrients present in the subsurface.
- Lower effectiveness in shallow aquifers (due to limited area for groundwater recirculation).

Several commercial variations of the in-well vapor stripping process have been developed. Three main types of in-well vapor stripping systems include the Unterdruck-Verdampfer-Brunnen (UVB) or "vacuum vaporizer well" system, the NoVOCs™ system, and the Density Driven Convection (DDC) system. All three systems can achieve remedial objectives for the off-site groundwater. For purposes of this FS, the UVB in-well vapor stripping system was selected for analysis and costing of the in-well vapor stripping alternatives. The UVB system was chosen for several reasons:

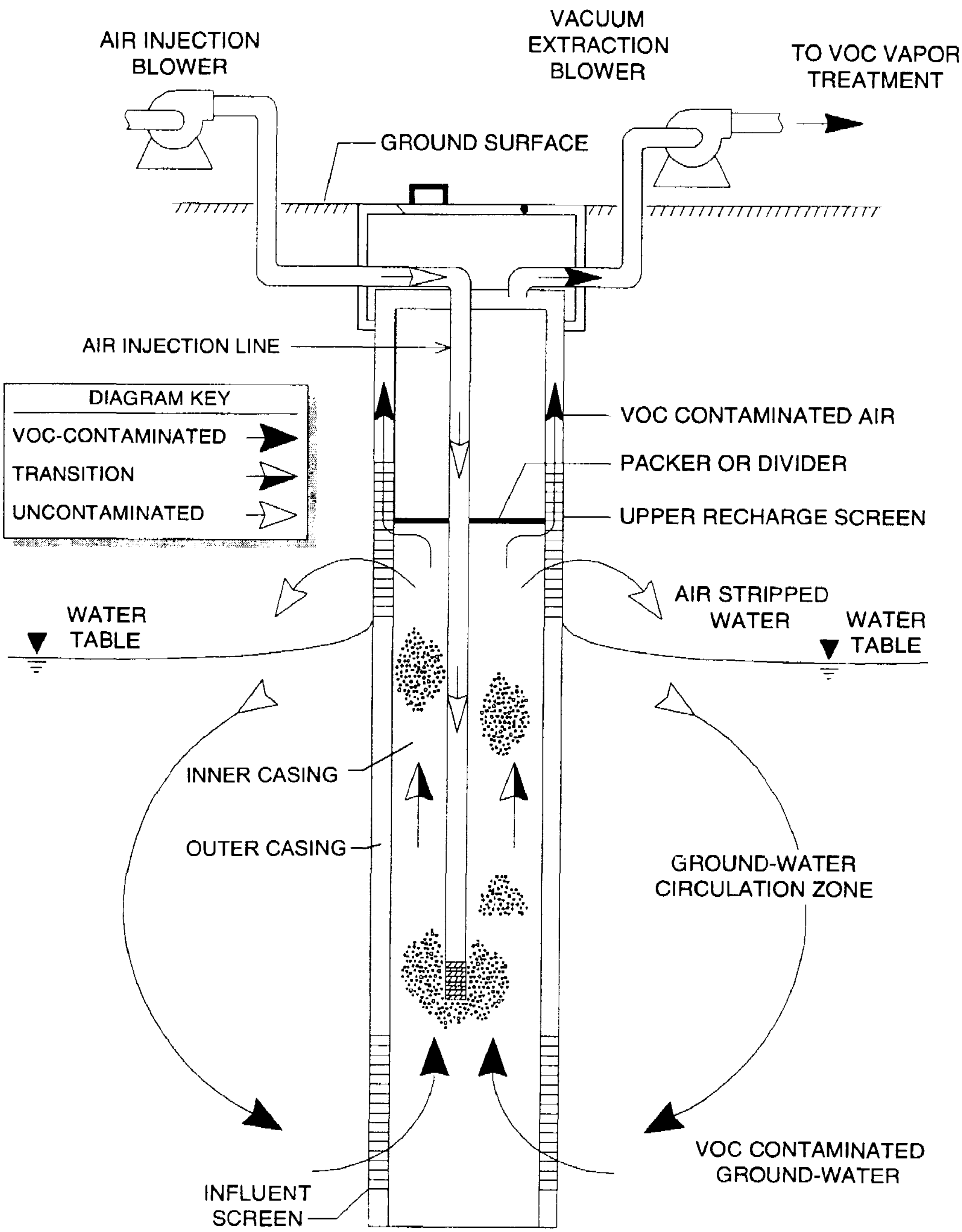
- The large amount of information and research readily available in the literature.
- Flexibility of the system to operate under various site conditions.
- Decreased moisture content in vapors to be treated.
- Lower likelihood of well screens to become clogged by iron and other precipitates.
- Previous demonstration at sites with other physical and contaminant characteristics similar to the NCIA off-site area.

System and cost information for an alternate in-well vapor stripping technology, DDC, was obtained. A sensitivity analysis of the UVB and DDC in-well vapor stripping technologies is provided in Appendix K.

11.3.4.1 ***In-Well Vapor Stripping.*** In-well vapor stripping (also known as in-situ vacuum, vapor, or air stripping) is a demonstrated in-situ physical/chemical treatment alternative for remediating contaminated groundwater, as per EPA's Superfund Innovative Technology Evaluation (SITE) program. The technology involves the creation of groundwater circulation patterns, or "cells", in the subsurface surrounding specially designed wells and simultaneous aeration within the wells to volatilize VOCs from the circulating groundwater. Contaminated vapors are typically extracted from the wells and treated at the surface; however, unlike conventional groundwater remediation systems, in-well vapor stripping does not require groundwater to be pumped to and treated at the surface. This in-well air stripping technology is most applicable to VOCs (such as PCE and TCE); however, modifications of the basic remedial process are proposed for applications to treat SVOCs, pesticides, and inorganics. In-well vapor stripping has been used in unconfined and confined aquifers and applied to geologic materials with a range of characteristics. A schematic of the in-well vapor stripping process is shown in Figure 11-3.

An in-well stripping well consists of an inner and an outer casing that are hydraulically separated from one another, usually by a packer or divider plate. This separation ensures one-directional flow of groundwater into the well at its base (through a lower screened interval) and out of the well near the water table (through an upper screened interval). Air is injected into the well through a gas injection line and diffuser, releasing bubbles into contaminated groundwater in the well. These bubbles aerate the water and form a type of air-lift pumping system (due to an imparted density gradient) that causes groundwater to flow upward in the well. As the bubbles rise, VOC compounds in the water are transferred from the dissolved state to the vapor state through an air stripping process.

The air/water mixture rises in the well until it encounters the dividing device within the inner casing. The divider is designed and located within the well to maximize volatilization. The air/water mixture flows from the inner casing to the outer casing through the upper screen. A vacuum is applied in the outer casing, and contaminated vapors are drawn upward through the annular space between the two casings and typically treated at the ground surface. The partially treated groundwater, from which some of the VOCs have been removed, re-enters the subsurface through the upper screen and infiltrates back to the aquifer and the zone of contamination where it is eventually cycled back into the well. This pattern of groundwater movement forms a circulation cell in the subsurface around the well that allows groundwater to undergo sequential treatment cycles until remedial objectives are achieved. A continuous VOC-rich vapor stream is created as contaminant concentrations in groundwater are significantly reduced.



Source: GWRTAC, 1997.

\650-428 NCIA FS\graphics\vaporstrippingdiagram.dsf

LMS Lawler, Matusky & Skelly Engineers LLP One Blue Hill Plaza • Pearl River, New York 10965 ENVIRONMENTAL SCIENCE & ENGINEERING CONSULTANTS	**In-Well Vapor Stripping Process** NEW CASSEL INDUSTRIAL AREA	Figure 11-3

R2-0000570

For the NCIA off-site groundwater, Alternative 4A includes the treatment of the contaminated groundwater to a depth of approximately 125 ft bgs via in-well vapor stripping wells. This alternative addresses "hot-spot" areas within the off-site contaminant plumes and assumes that natural attenuation will remediate a portion of the off-site groundwater over time. As discussed above, active source removal and groundwater remediation is in-place or planned at 13 source sites within the NCIA. Alternative 4A includes the installation of four (4) circulation/stripping wells (8-in. diameter) to address the off-site groundwater contamination, based on contaminant depths and radii of influence expected to be achieved at each well. Figure 11-4 shows approximate locations of the stripping wells for Alternative 4A.

As depicted, two different stripping well configurations will be used in Alternative 4A, based on conversations with a vender of this technology. A total of one 80-ft bgs and three 125-ft bgs wells will be installed within the off-site plumes, at areas of high VOC concentrations. Each well will be mounted flush with the existing ground surface and installed to varying depths, as indicated above. The vertical distances between the screened intervals in the 80-ft wells and 125-ft wells are estimated at 20 ft and 55 ft, respectively. Figure 11-5 displays the average total VOC concentration contours for groundwater depths of 65 to 125 ft bgs (from years 1996 – 2000). Figure 11-6 shows the proposed treatment wells for Alternative 4A, along with approximate radii of influence. A summary of the in-well vapor stripping system components is included in Table 11-5.

Based on the treatment technology and aquifer characteristics in the off-site area, the estimated groundwater flow rate in the 80-ft treatment well is 40 gpm, and the flow rate in the 125-ft wells is 10 gpm. According to venders of the in-well vapor stripping technology, the following radii of influence can be achieved for each type of stripping well in Alternative 4A: 80-ft well: 120 ft; and 125-ft well: 250 ft (refer to Figure 11-6).

Pilot studies (see below) and field measurements in the design phase of work will more accurately determine the construction details and placement of each of the in-well vapor stripping wells in Alternative 4A, along with the specific groundwater circulation/treatment patterns expected to result.

Alternative 4A components of the in-well vapor stripping system include: air injection blowers and vacuum extraction blowers (for vapor collection) and associated piping;

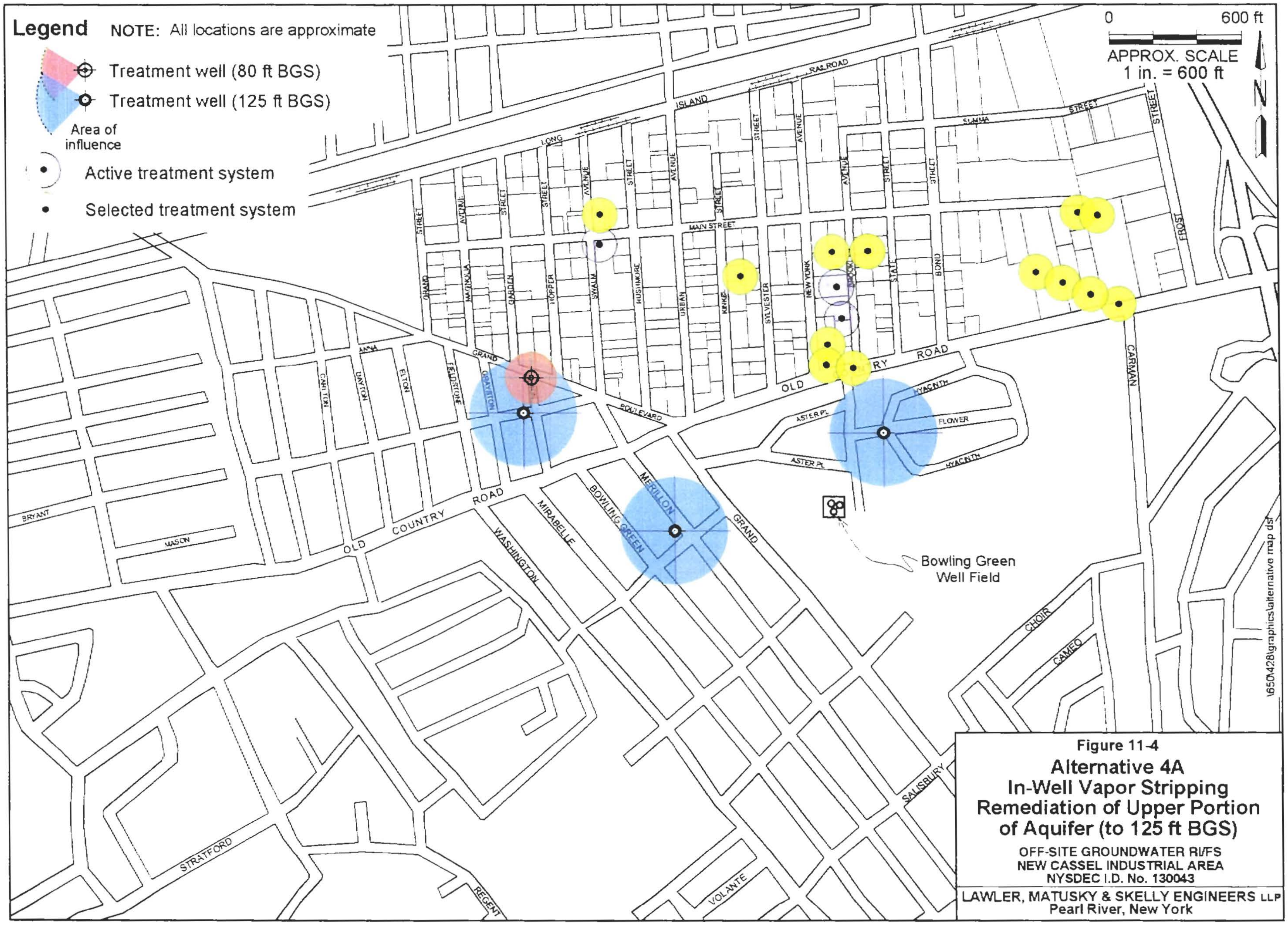


Figure 11-4
Alternative 4A
In-Well Vapor Stripping
Remediation of Upper Portion of Aquifer (to 125 ft BGS)
OFF-SITE GROUNDWATER RI/FS
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043
LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

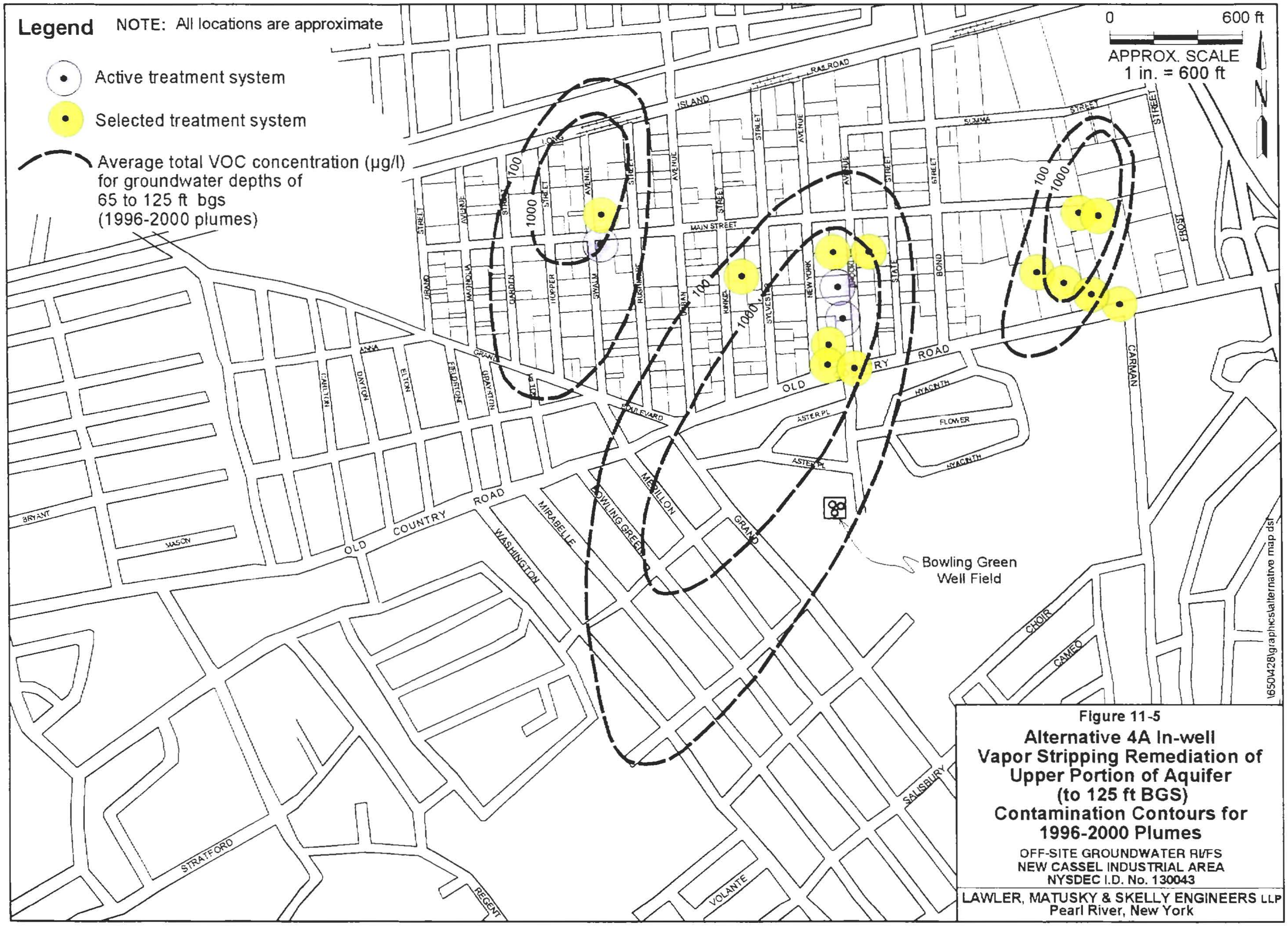


Figure 11-5
Alternative 4A In-well Vapor Stripping Remediation of Upper Portion of Aquifer (to 125 ft BGS) Contamination Contours for 1996-2000 Plumes

OFF-SITE GROUNDWATER RI/FS
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

Figure 11-6

Alternative 4A In-well Vapor Stripping Remediation of Upper Portion of Aquifer (to 125 ft BGS) Treatment Well Placement and Contamination Contours for 1996-2000 Plumes

OFF-SITE GROUNDWATER RI/FS
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

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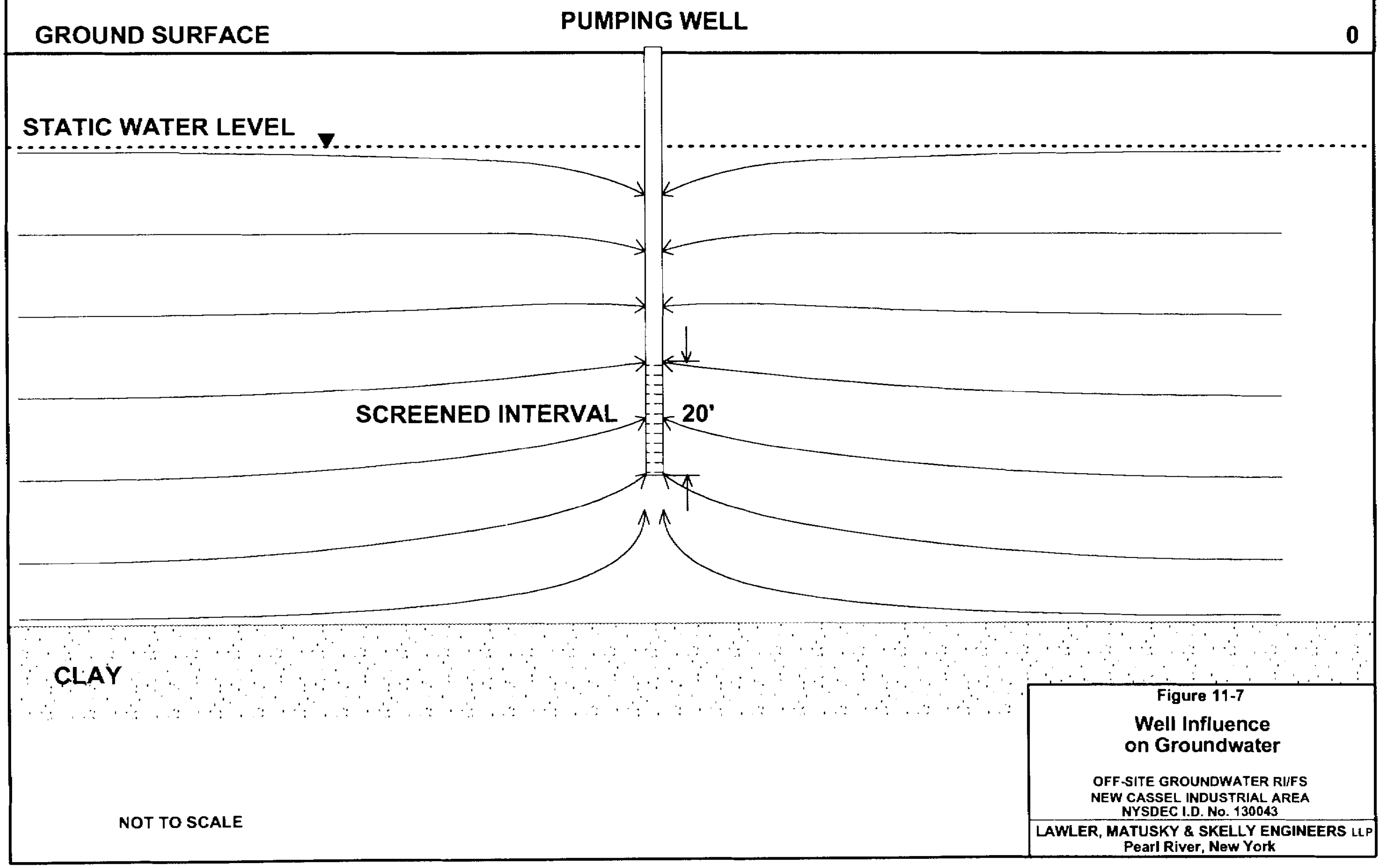

Figure 11-7

Well Influence on Groundwater

OFF-SITE GROUNDWATER RI/FS
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

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Pearl River, New York

diameter [steel construction], with pumping rates of 20 gpm and screened intervals of 90 to 110 ft bgs) and one 80-ft extraction well (6-in. diameter [steel construction], with a pumping rate of 40 gpm and a screened interval of 60 to 80 ft bgs) will be installed. All extraction wells will be mounted flush with the existing ground surface. Figure 11-7 shows a cross-section of a typical extraction well. Figure 11-8 shows approximate locations of the extraction wells for Alternative 4B. On Figure 11-8, average total VOC plumes, derived from plume maps for groundwater depths between 65 and 125 ft bgs, are also shown. The wells were located based on the natural direction of groundwater flow and hydraulic conductivity. The 80-ft extraction well was situated to assist in remediating the elevated VOC levels in the western plume.

Each 20 gpm pumping well will contain a 1.5 hp pump with a 1.5-in. outlet. The 40 gpm pumping well will contain a 3 hp pump with a 2-in. outlet. The contaminated groundwater for Alternative 4B will be collected and transferred to a centralized treatment facility from each extraction well via subsurface pipelines. The groundwater will be metered and the flow regulated, ensuring that each pumping well is operating efficiently. This approximately 3200 sf treatment facility will likely be located to the east of the Bowling Green supply wells, as depicted in Figure 11-8.

An estimate of the remediation time was calculated based on assumptions in aquifer characteristics, well placement, flow rates, and contaminant properties. An estimated timeframe for active remediation of 9 years was used for Alternative 4B. Because of the uncertainty in the hydrological parameters (i.e., hydraulic conductivity), the results of this estimation should be confirmed in the design phase, after an aquifer pump test and a pilot study have been completed. In addition, the pilot study can also help identify potential impacts of the extraction wells on the Bowling Green supply wells or other remediation systems (i.e., within the NCIA).

11.3.5.2 ***Groundwater Treatment and Discharge.*** In order to satisfy SCGs, specifically groundwater treatment effluent criteria, the extracted groundwater must be treated to remove groundwater contaminants. Potentially relevant criteria that may apply to discharges of treated water to the groundwater include NYS Groundwater Effluent Limitations (Class GA), SPDES requirements, and EPA's UIC Program criteria (refer to Chapter 7). Prior to the final design of the remediation system, the relevant portions of these SCGs should be agreed upon by all local, state, and Federal agencies, as

Table 11-7

PUMP AND TREAT SUMMARY
NCIA Off-Site Groundwater

	TOTAL FLOW (gpm)	ACTIVE REMEDIATION TIME (years)	BASE (NaOH) ADDITION (gal/30 day)	ACID (H_2SO_4) ADDITION (gal/30 day)	COAGULANT ($FeCl_3$) ADDITION (lb/30 day)	SLUDGE PRODUCED (gal/30 day)	SLUDGE PRODUCED (gal/yr)	SIZE OF TREATMENT PLANT (sq ft)	NO. 8-ft WET WELLS (no.)	RATE OF AIR THROUGH CARBON (ft^3/min)	INITIAL CARBON USAGE (lb/day)
Alternative 4B	100	9	825	425	20	20	220	3,200	4	1000	30
	1 extraction well installed to depth of 80 ft bgs, pumping at 40 gpm. 3 extraction wells each installed to a depth of 110 ft bgs, each pumping at 20 gpm. 20 year total alternative timeframe.										
Alternative 5B	100	12	825	425	20	20	220	3,200	4	1000	30
	1 extraction well installed to depth of 80 ft bgs, pumping at 40 gpm. 3 extraction wells each installed to a depth of 150 ft bgs, each pumping at 20 gpm. 20 year total alternative timeframe.										
Alternative 6B	260	7	2100	1075	40	48	560	4,000	7	2600	70
	1 extraction well installed to depth of 80 ft bgs, pumping at 40 gpm. 11 extraction wells each installed to a depth of 110 ft bgs, each pumping at 20 gpm. 20 year total alternative timeframe.										
Alternative 7B	280	10	2250	1150	45	50	600	4,000	8	2800	75
	1 extraction well installed to depth of 80 ft bgs, pumping at 40 gpm. 12 extraction wells each installed to a depth of 150 ft bgs, each pumping at 20 gpm. 20 year total alternative timeframe.										

(i.e., ex-situ) at one centralized treatment plant location. Justifications for utilizing a centralized treatment system for the groundwater extraction/air stripping (i.e., "pump and treat") alternatives presented in this FS are included in Appendix L. Treatment of the groundwater via air stripping will typically generate an air emission, which will also require treatment to remove vapor phase contaminants. Active source removal and groundwater remediation is in-place or planned at 13 source sites within the NCIA, as previously described.

The objective of groundwater extraction is to draw contaminated groundwater into the capture zone of one or more extraction wells. The flow rate of the extraction well(s) is increased until the capture zone(s) is believed to exceed the contaminated area of concern. The extraction well should ideally be located sufficiently downgradient of the highest contaminated area in the plume so that the majority of the contaminated groundwater will naturally flow into the capture zone. Alternative 4B includes extraction well patterns designed to reduce the VOC concentrations in the off-site groundwater.

When simulating this groundwater extraction and treatment option, the number of wells, pumping rates, and well locations have been optimized by determining which combination would effectively capture the highest percentage of the contaminated groundwater of concern. These analyses were based on data collected for the RI. Prior to final design, aquifer pump tests (i.e., one per plume assumed for this FS) and a treatability/pilot study should be completed to determine more accurate hydraulic conductivity values and other aquifer characteristics that will aid in planning the remedial design and verifying assumptions made regarding number of wells, well spacing, capture zone, flow rates, treatment equipment, and the times required to remediate.

For this FS, Alternative 4B includes the treatment of the contaminated groundwater to a depth of 125 ft bgs via extraction wells. Alternative 4B addresses "hot-spot" areas within the off-site contaminant plumes and assumes that natural attenuation will remediate a portion of the off-site groundwater over time. Table 11-7 summarizes the system components of the groundwater extraction/air stripping system alternatives developed for this FS.

11.3.5.1 ***Extraction Wells.*** Alternative 4B includes the installation of four extraction wells within the contaminant plume. Three 110-ft extraction wells (each 6-in. in

TABLE 11-6

ALTERNATIVE 4A
IN-WELL VAPOR STRIPPING
MONITORING PROGRAM SUMMARY [1]
NCIA Off-Site Groundwater

WELL[7]	Plume Location	DEPTH[3]	SAMPLING SCHEDULE[4] YEARS 1-2	SAMPLING SCHEDULE[5] YEARS 3-20
N-10477	West	57 ft (shallow)	X	X
N-10478	West	121 ft (intermediate)	X	X
N-11851	West	65 ft (shallow)	X	X
NRMW-4	West	70 ft (intermediate)	X	X
N-11848	West	60 ft (shallow)	X	X
N-11860	Central	60 ft (shallow)	X	X
N-11862	Central	60 ft (shallow)	X	X
N-10476	Central	130 ft (deep)	X	X
N-11861	Central	60 ft (shallow)	X	X
EW-1B	Central/East	164 ft (deep)	X	X
EW-1C	Central/East	516 ft (deep)	X	X
EW-2B	Central/East	142 ft (deep)	X	X
EW-2C	Central/East	514 ft (deep)	X	X
NRMW-1	Central/East	70 ft (intermediate)	X	X
N-9939	Central/East	74 ft (intermediate)	X	X
N-10329	East	57 ft (shallow)	X	X
6 proposed new well couplets[6]		**intermediate/deep**	X	X
		TOTAL:	**28**	**28**

X - Sampling is recommended.
1 - This is a preliminary monitoring program developed for cost estimation purposes, the final monitoring program will be established during the remedial design phase, depending on the sample results, the schedule may be modified.
2 - Well locations are depicted on Figures 3-4, 3-5, and 3-6 of the RI report.
3 - Shallow groundwater exists at depths between the water table and 64-ft; intermediate groundwater exists from approximately 65-124 ft bgs. deep groundwater exists at depths of 125 ft bgs or greater.
4 - All samples will be analyzed for VOCs quarterly.
5 - All samples will be analyzed for VOCs annually.
6 - For costing purposes, it is assumed that 6 new monitoring well locations will be established at locations downgradient and sidegradient of existing off-site plumes to monitor future VOC migration. It is assumed that monitoring wells will be installed at intermediate and deep depths as follows.
A total of 3 intermediate wells will be installed to 70 ft bgs; the remaining 3 intermediate wells are to be installed to a depth of 100 ft bgs.
A total of 3 deep wells will be installed to 200 ft bgs, the 3 remaining deep wells are to be installed to a depth of 250 ft bgs.

layout as described for long-term monitoring in Alternative 2). The results of these analyses will be used to determine whether remedial action objectives are being satisfied, and whether changes in system design, configuration, and operation are required. In Alternative 4A, groundwater monitoring is assumed to be conducted quarterly for the first two years after remediation system startup and annually for years 3-20 (i.e., to cover life of remedial system and thirteen additional years to evaluate natural attenuation). Table 11-6 itemizes the groundwater monitoring schedule for Alternative 4A.

The continued need for monitoring can be re-evaluated and possibly discontinued at any time during the project timeframes. For instance, if groundwater contaminant levels remain below the site remedial action objectives for two or three consecutive sampling events, the monitoring program may be considered for discontinuation. If contaminant levels continue to exceed the remedial action objectives at the end of the 20-yr period, the monitoring program should be extended and active remediation may be re-established and/or other remedial actions may be taken.

Inspection of the GAC vapor treatment systems and monitoring of any off-gas emissions will also occur as part of the overall system monitoring. It is assumed that samples of emissions will occur every two months for the first year of system operation, and semiannually after that for the duration of the active remediation timeframe. As with the groundwater monitoring, the continued need for air emissions monitoring will be re-evaluated during the course of the project, and may be reduced or considered for discontinuation after system start-up.

Alternative 4A also includes the operation and maintenance, including replacement of equipment as needed, of the VOC treatment processes that are currently in-place at the Bowling Green Water District (refer to Alternative 1).

11.3.5 Alternative 4B: Remediation of Upper Portion of Aquifer (to 125 ft bgs) with Groundwater Extraction / Centralized Air Stripping and Vapor Treatment / Effluent Re-Injection

Alternative 4B has been developed to evaluate the feasibility of using a groundwater extraction system to capture the off-site groundwater contamination in the upper portion (i.e., at depths from the water table to 125 ft bgs) of the aquifer and treat it at the surface is maintained within satisfactory limits. Any condensate that is created in the system will be collected at the well heads and periodically disposed of at an approved off-site facility.

A preliminary review of the VOC constituents and respective vapor phase concentrations anticipated at each well head for the Alternative 4A scenario indicates that an emission stack will not be required. However, the ultimate configuration of the localized vapor recovery/treatment systems, including GAC usage rates over time, should be based on the final design and results from the pilot studies. Air monitoring and inspection of the vapor treatment systems after startup may also assist in determining system requirements. For cost estimating purposes, GAC was the assumed vapor phase treatment option for the in-well vapor stripping Alternative 4A. However, other vapor phase treatment options (i.e., catalytic oxidation) may be evaluated during the final design and pilot study.

11.3.4.3 ***Waste Disposal.*** Minimal trenching is required for the Alternative 4A scenario, as control of the stripper wells and vapor phase treatment occurs in subsurface vaults placed near each of the treatment wells. It is estimated that approximately 210 yd^3 of uncontaminated, nonhazardous soil will require off-site disposal from the installation of the four stripping wells and treatment vaults in Alternative 4A. All streets and areas disturbed by installation of the remediation system will be restored to original conditions.

It is conservatively estimated that approximately 70 gallons per month of condensate will accumulate under Alternative 4A. Condensate will be periodically collected and disposed of at an approved off-site facility. Analytical sampling of the condensate and any other materials generated during remedial activities will be conducted to characterize the wastes and identify disposal options.

Table 11-5 summarizes the system components of the in-well vapor stripping alternatives developed for this FS.

11.3.4.4 ***System Performance Monitoring.*** To confirm that the in-well vapor stripping system described above for Alternative 4A and natural attenuation are achieving remedial objectives, periodic groundwater sampling will be conducted. For cost estimating purposes, it was assumed that groundwater samples will be collected from 16 existing monitoring wells in the off-site area and analyzed for VOCs. In addition, it is assumed that six new well couplets will be installed at intermediate and deep depths (i.e., same in-well vapor stripping pilot tests (i.e., one per off-site contaminant plume) will be conducted under Alternative 4A.

For cost estimating purposes, it is assumed that the in-well vapor stripping system will run for seven years under Alternative 4A (based on discussion with vendors and a review of case studies). The actual timeframe may differ from seven years; better estimates of cleanup time can be made based on the pilot tests. The seven year timeframe for active remediation accounts for the fact that stripper wells are placed only in "hot spot" areas. The four stripper wells may actually need to run longer than estimated since contamination from outside the "hot spot" areas may be drawn to the wells during the course of remediation. Many parameters used in deriving this estimate can vary widely, which would impact the remediation time. Results of pilot tests should be used to better estimate the Alternative 4A timeframe.

11.3.4.2 ***Vapor Phase Treatment.*** For Alternatives 4A, vapors from the in-well vapor stripping processes will be collected from each stripping well and transferred with a vacuum extraction blower to a GAC treatment system within each vault. The vapors containing VOCs are passed through the GAC medium, adsorbed, and then vented to the atmosphere. GAC was selected as the optimal vapor phase treatment option for Alternative 4A based on anticipated flow rates and contaminant concentrations.

In Alternative 4A, the vapor phase flow rates to the local GAC treatment system differ for each type of stripper well (i.e., 80-ft and 125-ft treatment wells). The vapor phase flow rate (assuming a 75:1 air-to-water ratio) was calculated to be 700 scfm. The initial carbon usage rate was estimated to be 35 lb/day. A summary of the in-well vapor stripping system components is included in Table 11-5. For the in-well vapor stripping alternatives, it is assumed that as VOC concentrations in the groundwater and vapor streams are reduced over time, the carbon usage rates will also decrease. When GAC is spent (i.e., saturated with VOCs), it is transported off-site for regeneration and replaced with fresh material.

High relative humidity of the treated vapor (i.e., above about 50%) reduces the adsorption efficiency of the GAC. Thus, vacuum extraction blowers in Alternative 4A should be specified so that sufficient heat is imparted to the vapor stream and the relative humidity moisture separators and condensate storage containers; and system control equipment (i.e., valves, meters, electronics, gauges, chemical delivery systems [if required]). Subsurface treatment vaults will be constructed adjacent to each of the in-well vapor stripping wells. The vaults will house all treatment equipment associated with this alternative, and will be constructed to be "low profile" as to blend-in with the surrounding residential/institutional properties. Significant quantities of piping for air injection and vapor extraction are not needed in Alternative 4A since all treatment is conducted at each well head. Justifications for utilizing localized treatment systems for the in-well vapor stripping alternatives presented in this FS are included in Appendix L.

Operation and maintenance costs include electricity to power the remediation system; periodic repair and replacement of system parts/components; routine operator inspection of the system; and system monitoring. Based on data from recent groundwater sampling events in the off-site area and discussions with a vender of the in-well vapor stripping technology, it was determined that an iron control system would likely not be needed for the in-well vapor stripping alternatives. Rather, any iron/inorganic precipitation can be addressed with routine cleaning of UVB well components as part of the system operation and maintenance program. System inspection, maintenance, and monitoring activities consist of assessments of the in-well vapor stripping system, cleaning and maintaining the components, and collection of real-time air measurements, as necessary. For Alternative 4A, it is assumed that a part-time operator will be needed to operate, supervise, and monitor the in-well vapor stripping process and localized treatment vaults.

Prior to final design of Alternative 4A, pilot-scale treatability studies should be performed to determine the off-site groundwater remediation timeframes and system specifications of the in-well vapor stripping systems. Pilot scale tests can also determine optimal system configurations and design parameters, such as number/location of wells, operating pressures, and flow rates to remove contaminants from the groundwater. The results of a pilot study can also be used to evaluate the airflow distribution and vapor phase treatment approaches. In addition, potential impacts from natural iron and pH in the subsurface can be better evaluated. The results of the pilot tests will also be used to better estimate the power requirements of the systems. Any potential effects from in-well vapor stripping on the Bowling Green supply wells or other remediation systems (i.e., within the NCIA) can also be evaluated. For this FS, it was assumed that a total of three

Table 11-5

IN-WELL VAPOR STRIPPING SUMMARY
NCIA Off-Site Groundwater

	NO. 125 or 200 ft Treatment Wells 10 gpm 100 scfm	NO. Containment Treatment Wells 10 gpm 100 scfm	NO. 80 or 140 ft Treatment Wells 40 gpm 400 scfm	TOTAL FLOW (gpm)	ACTIVE REMEDIATION TIME (years)	TOTAL ALTERNATIVE TIMEFRAME (years)	TOTAL CONDENSATE (gal/year)	RATE OF AIR THROUGH CARBON (ft^3/min)	INITIAL CARBON USAGE (lb/day)
Alternative 4A	3 Well Depth = 125 ft bgs H = 55 ft ROI = 250 ft	0 NA NA NA	1 Well Depth = 80 ft bgs H = 20 ft ROI = 120 ft	70	7	20	860	700	35
Alternative 5A	3 Well Depth = 200 ft bgs H = 100 ft ROI = 325 ft	0 NA NA NA	3 Well Depth = 140 ft bgs H = 50 ft ROI = 175 ft	150	9	20	1820	1500	60
Alternative 6A	3 Well Depth = 125 ft bgs H = 55 ft ROI = 250 ft	5 Well Depth = 150 ft bgs H = 80 ft ROI = 315 ft	1 Well Depth = 80 ft bgs H = 20 ft ROI = 120 ft	120	5	20	1460	1200	55
Alternative 7A	4 Well Depth = 200 ft bgs H = 100 ft ROI = 325 ft	5 Well Depth = 225 ft bgs H = 150 ft ROI = 510 ft	4 Well Depth = 140 ft bgs H = 50 ft ROI = 175 ft	250	7	20	3040	2500	105

Notes: - H denotes approximate vertical distance between well screens.
- ROI denotes anticipated radius of influence for stripper wells.

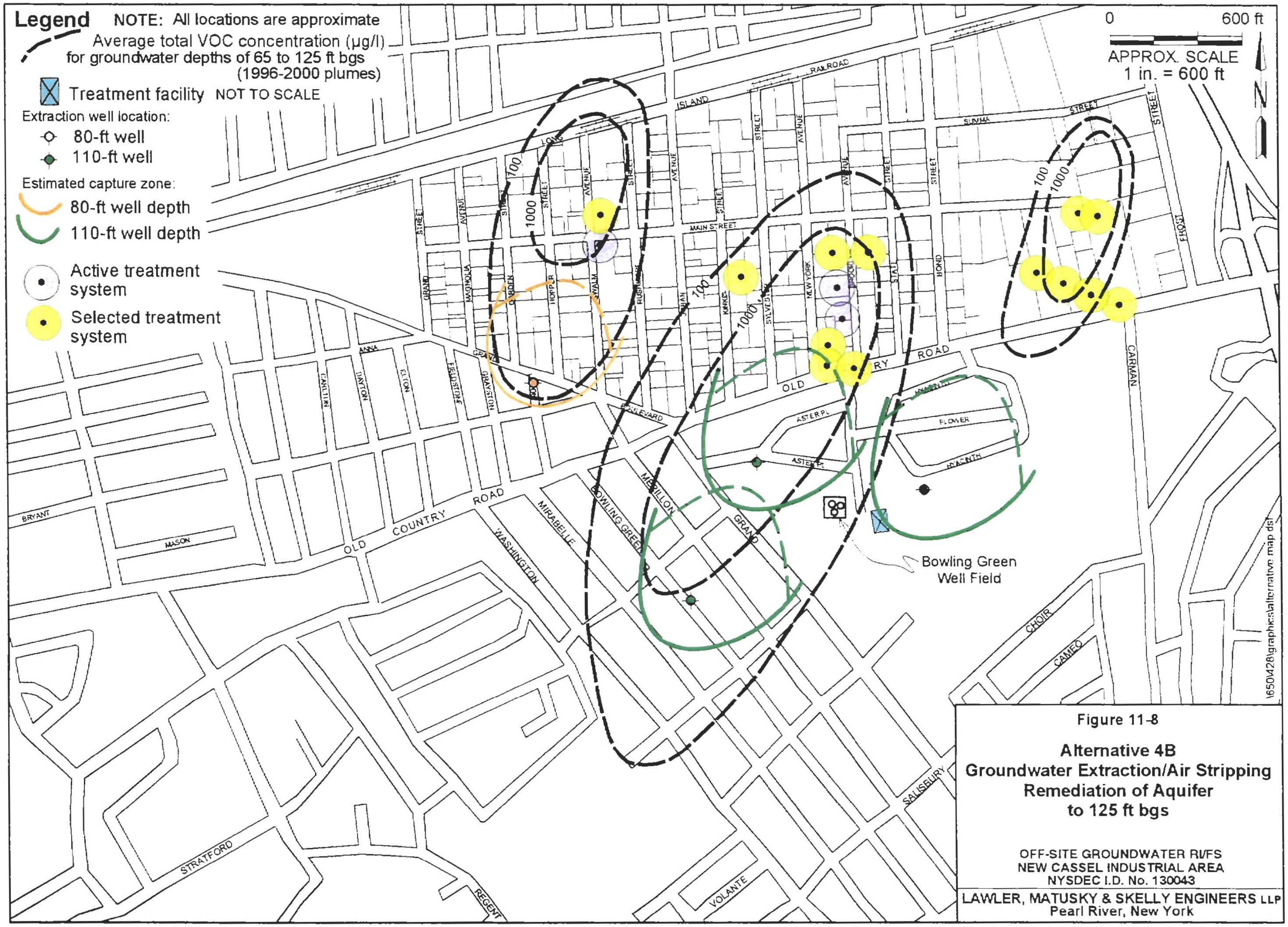

Figure 11-8

Alternative 4B
Groundwater Extraction/Air Stripping
Remediation of Aquifer
to 125 ft bgs

OFF-SITE GROUNDWATER RI/FS
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

appropriate. Treatment for Alternative 4B will occur in a central location within the NCIA off-site area, as described above. The exact location and configuration of the central treatment building should be confirmed during the design phase.

In Alternative 4B, after the pumped groundwater has been metered inside of the treatment facility, it undergoes various levels of treatment, as shown in Figure 11-9. The contaminated groundwater first enters an equalization tank (with a mixer) to equalize the flows from the extraction wells. The water will then flow via gravity into a pH adjustment/reaction tank. With the addition of a base compound (e.g., sodium hydroxide), the pH will be raised to about 8 to 10, and a coagulant will be added into the reaction tank to help flocculate and precipitate any soluble inorganic constituents. A mixer will ensure that the base and the coagulant become completely mixed before passing (via gravity) into the settling tank/clarifier unit. In the settling tank, a sludge will be produced as inorganic compounds (such as soil particles) settle to the bottom of the tank. The sludge will be dewatered to form a sludge cake, which will be disposed of off-site. It is assumed in the cost estimate that this sludge cake will be disposed of as nonhazardous waste; this assumption should be verified in the final design phase with TCLP waste characterization analyses. The supernatant from the dewatering process will be recycled back into the equalization tank. Anticipated chemical use and sludge production rates for all of the groundwater extraction/air stripper alternatives are summarized in Table 11-7.

The contaminated groundwater that passes through the settling tank will then be pumped into a media filter to remove solids. An acidic compound (e.g., sulfuric acid) will be added to lower the pH to about 6 to 7 before the water is fed into a low profile tray air stripper. The low profile stripper is better suited than an air stripping tower for this project due to the proximity of residential and institutional properties. GAC was selected as the optimal vapor phase treatment option for Alternative 4B based on anticipated flow rates and contaminant concentrations. The vapor emitted from the air stripper will undergo treatment via GAC to remove the volatile constituents that have been stripped out of the groundwater. A vapor phase flow rate of 1000 scfm was estimated for Alternative 4B. Following vapor phase GAC treatment, the air emission will be vented to the atmosphere. An initial carbon usage rate of 30 lb/day was estimated for Alternative 4B. Vapor flow rates and initial carbon usage rates for the groundwater extraction/air stripping alternatives are listed in Table 11-7.

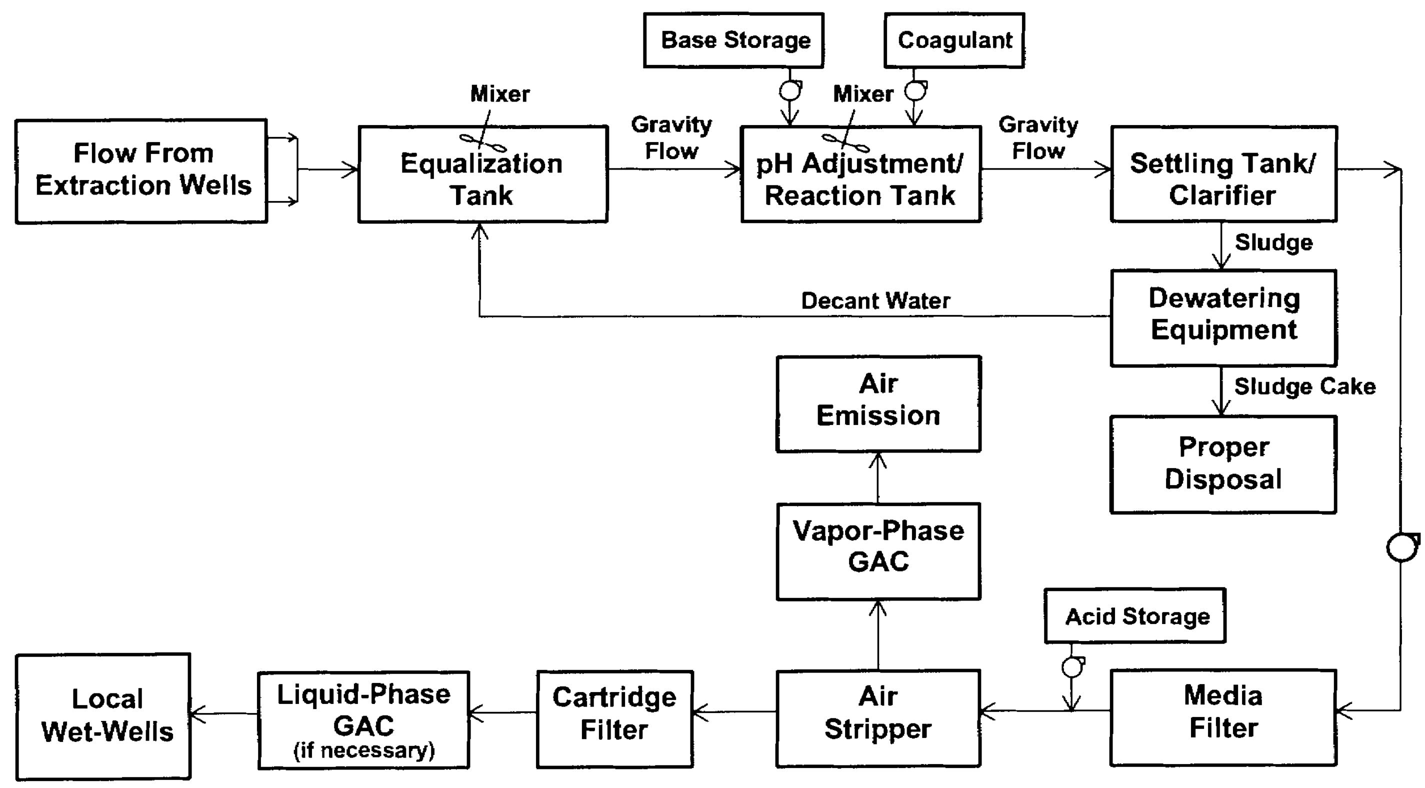

Figure 11-9
Schematic of
Groundwater Treatment Operations
Groundwater Extraction/Air Stripping
OFF-SITE GROUNDWATER RI/FS
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

A preliminary review of the VOC constituents and respective vapor phase concentrations indicates that an emission stack will probably not be required. However, the ultimate configuration of the entire vapor recovery/treatment system, including GAC usage rates over time, should be based on the final design and results from the pilot study. Air monitoring and inspection of the vapor treatment system after startup may also assist in determining system requirements. For cost estimating purposes, GAC was the assumed vapor phase treatment option for Alternative 4B. However, other vapor phase treatment options (i.e., catalytic oxidation) may be evaluated during the final design and pilot study. In addition, results from the pilot study should be used during the detailed design of the groundwater treatment facility to confirm chemical dosage rates and process specifications, as well as to optimize the contact times in the tanks. Potential impacts from iron and natural pH in the subsurface can also be better assessed.

The liquid effluent leaving the air stripper will be passed through a cartridge filter to remove any remaining solids before being discharged into nearby wet wells for re-injection to the subsurface. The wet wells are assumed to be located next to the central treatment building, within Nassau County Basin 51 (a local stormwater retention basin). As shown in Table 11-7, Alternative 4B will have four 8-ft diameter wet wells with approximate depths of 15 ft bgs. The wet wells will be operated in parallel to handle overflow and maintenance periods. Re-injection of treated water into the subsurface will require that all relevant discharge standards are achieved. In addition, local or state permits may be required. The treatability/pilot study will help to evaluate the ability of the treatment processes to meet discharge requirements. A pilot study can also help determine reinjection schedules and potential impacts of reinjection on the Bowling Green supply wells or other remediation systems (i.e., within the NCIA). If discharge limitations are not satisfied, polishing with carbon adsorption may be necessary. The treated effluent will be periodically monitored to ensure that discharge limits are met (sampling frequencies are described in the next section).

Due to the need for a treatment facility at the proposed location, an appropriate building would need to be constructed to house the treatment equipment (i.e., the treatment facility and associated units and piping should be low profile as to blend-in with the surroundings). For Alternative 4B, it is suspected that a half-time operator will be needed to operate, supervise, and monitor the extraction wells and the treatment plant processes.

It is estimated that approximately 15 yd^3 of nonhazardous soil will require off-site disposal from the installation of the four extraction wells in Alternative 4B. In addition, approximately 14,800 ft^2 of asphalt will also be excavated and require off-site disposal under Alternative 4B. All streets and areas disturbed by trenching and installation of the remediation systems will be restored to original conditions. It is estimated that approximately 3700 l.f. of trenching are required under Alternative 4B.

Operation and maintenance associated with the treatment system costs include electricity to power the remediation system; periodic repair and replacement of system parts/components; routine operator inspection of the system; and system monitoring. System inspection, maintenance, and monitoring activities consist of assessments of the system, cleaning and maintaining the components, and collection of real-time air measurements, as necessary.

11.3.5.3 ***System Performance Monitoring.*** For the purposes of this FS, it is assumed that the extraction and treatment system for Alternatives 4B will operate for nine years. This estimate was based on the time it would take for the furthest contaminant with the slowest velocity in the groundwater of concern to be captured by the groundwater extraction system (approximately seven years). The controlling retardation factor, which affects contaminant transport velocity, was found to be that of PCE. An average hydraulic conductivity of 70 ft/day was used in the calculation. Two additional years were added to the Alternative 4B active remediation timeframe, for a total of nine years, to account for the fact that extraction wells are placed only in "hot spot" areas. The four extraction wells may actually need to run longer than calculated since contamination from outside the "hot spot" areas may be drawn to the wells during the course of remediation. Many parameters used in deriving this estimate can vary widely, which would impact the remediation time. Results of pilot tests should be used to better estimate the Alternative 4B timeframe.

The long-term monitoring program included in this alternative is intended to assess the effectiveness of groundwater extraction/treatment and natural attenuation on the contaminant levels in the aquifer over time. Monitoring will consist of system performance monitoring and effluent quality monitoring. For Alternative 4B, during the first three months that the treatment plant is in operation, VOC samples will be collected from the equalization tank and the effluent pipe once per week to evaluate the efficiency and effectiveness of the treatment plant. The effluent sample analysis will be used to demonstrate that all discharge requirements are being met. For the remainder of the active remediation life of the alternative, VOC sampling at each of the influent pipes and the single effluent pipe at the treatment plant will be collected once per month. Samples will be analyzed for conventional parameters (e.g., pH, solids, and alkalinity) as well as VOC content. As reference, Table 11-8 lists the effluent limitations for the VOCs of concern.

In addition, periodic monitoring well sampling will be conducted to ensure that the pump and treat system and natural attenuation are remediating the off-site groundwater contaminant plumes. For cost estimating purposes, it was assumed that groundwater samples will be collected from 16 existing monitoring wells in the off-site area and analyzed for VOCs. In addition, it is assumed that six new well couplets will be installed at intermediate and deep depths (i.e., same layout as described for long-term monitoring in Alternative 2). The results of these analyses will be used to determine whether remedial action objectives are being satisfied, and whether changes in system design, configuration, and operation are required. In Alternative 4B, groundwater monitoring is assumed to be conducted quarterly for two years after remediation system startup and annually for year 3-20 to cover the remainder of the estimated life of the active remediation and an additional eleven years to evaluate natural attenuation. Table 11-9 itemizes the groundwater monitoring schedule for Alternative 4B.

The continued need for monitoring can be re-evaluated and possibly discontinued at any time during the project timeframes. For instance, if groundwater contaminant levels remain below the site remedial action objectives for two or three consecutive sampling events, the monitoring program may be considered for discontinuation. If contaminant levels continue to exceed the remedial action objectives at the end of the 20-yr period, the monitoring program should be extended and active remediation may be re-established and/or other remedial actions may be taken.

Inspection of the GAC vapor treatment system and monitoring of any off-gas emissions will also occur as part of the overall system monitoring. It is assumed that samples of emissions will occur every two months for the first year of system operation, and semiannually after that for the duration of the active remediation timeframe. As with the

TABLE 11-8

EFFLUENT LIMITATIONS FOR COCs

NCIA Off-Site Groundwater

Chemical Constituent	Effluent Limitation [1] (µg/l)
1,1-Dichloroethane	5
1,1-Dichloroethene	5
1,2-Dichloroethene (total)	5
1,2-Dichloroethane	0.6
Tetrachloroethene	5
Trichloroethene	5
Vinyl Chloride	2
1,1,1-Trichloroethane	5
Iron and Manganese (combined)	1,000

1 - Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Table 5 (NYSDEC 1998).

TABLE 11-9

ALTERNATIVE 4B
GROUNDWATER EXTRACTION / AIRSTRIPPING
MONITORING PROGRAM SUMMARY [1]
NCIA Off-Site Groundwater

WELL[2]	Plume Location	DEPTH [3]	SAMPLING SCHEDULE [4] YEARS 1-2	SAMPLING SCHEDULE [5] YEARS 3-20
N-10477	West	57 ft (shallow)	X	X
N-10478	West	121 ft (intermediate)	X	X
N-11851	West	65 ft (shallow)	X	X
NRMW-4	West	70 ft (intermediate)	X	X
N-11848	West	60 ft (shallow)	X	X
N-11860	Central	60 ft (shallow)	X	X
N-11862	Central	60 ft (shallow)	X	X
N-10476	Central	130 ft (deep)	X	X
N-11861	Central	60 ft (shallow)	X	X
EW-1B	Central/East	164 ft (deep)	X	X
EW-1C	Central/East	516 ft (deep)	X	X
EW-2B	Central/East	142 ft (deep)	X	X
EW-2C	Central/East	514 ft (deep)	X	X
NRMW-1	Central/East	70 ft (intermediate)	X	X
N-9939	Central/East	74 ft (intermediate)	X	X
N-10329	East	57 ft (shallow)	X	X
6 proposed new well couplets[6]		**intermediate/deep**	X	X
		TOTAL:	**28**	**28**

X - Sampling is recommended.
1 - This is a preliminary monitoring program developed for cost estimation purposes; the final monitoring program will be established during the remedial design phase; depending on the sample results, the schedule may be modified.
2 - Well locations are depicted on Figures 3-4, 3-5, and 3-6 of the RI report.
3 - Shallow groundwater exists at depths between the water table and 64-ft; intermediate groundwater exists from approximately 65-124 ft bgs. deep groundwater exists at depths of 125 ft bgs or greater.
4 - All samples will be analyzed for VOCs quarterly.
5 - All samples will be analyzed for VOCs annually.
6 - For costing purposes, it is assumed that 6 new monitoring well locations will be established at locations downgradient and sidegradient of existing off-site plumes to monitor future VOC migration. It is assumed that monitoring wells will be installed at intermediate and deep depths as follows:
A total of 3 intermediate wells will be installed to 70 ft bgs, the remaining 3 intermediate wells are to be installed to a depth of 100 ft bgs.
A total of 3 deep wells will be installed to 200 ft bgs, the 3 remaining deep wells are to be installed to a depth of 250 ft bgs.

groundwater monitoring, the continued need for air emissions monitoring will be re-evaluated during the course of the project, and may be reduced or considered for discontinuation after system start-up.

Alternative 4B also includes the operation and maintenance, including replacement of equipment as needed, of the VOC treatment processes that are currently in-place at the Bowling Green Water District (refer to Alternative 1).

11.3.6 Alternative 5A: Remediation of Upper and Deep Portions of Aquifer (to 200 ft bgs) with In-Well Vapor Stripping / Localized Vapor Treatment

Alternative 5A is similar to Alternative 4A presented above but utilizes in-well vapor stripping to address contaminated groundwater in the upper and deep portions of the aquifer. It addresses "hot-spot" areas within the off-site contaminant plumes and assumes that natural attenuation will remediate a portion of the off-site groundwater over time. As discussed above, active source removal and groundwater remediation is in-place or planned at 13 source sites within the NCIA. Figure 11-10 shows approximate locations of the stripping wells for Alternative 5A. Figure 11-11 shows total VOC contaminant plumes (averaged from depths of 65 – 200 ft bgs) from years 1996-2000. Figures 11-12 displays treatment well radii of influence and portions of the off-site plumes addressed in Alternative 5A.

Alternative 5A includes the treatment of the contaminated off-site groundwater via six in-well vapor stripping wells. Alternative 5A includes the installation of three 140-ft and three 200-ft treatment wells. Table 11-5 summarizes the system components and operation parameters for Alternative 5A. As for the scenarios presented for the other in-well vapor stripping alternatives, pilot studies and field measurements in the design phase of work will more accurately determine the construction details and placement of each of the in-well vapor stripping wells in Alternative 5A, along with the specific groundwater circulation/treatment patterns expected to result.

Based on the treatment technology and aquifer characteristics in the off-site area, the estimated groundwater flow rate in each of the 140-ft wells is 40 gpm and the flow rate in the 200-ft wells is 10 gpm. According to venders of the in-well vapor stripping technology, the following radii of influence can be achieved for each type of stripping

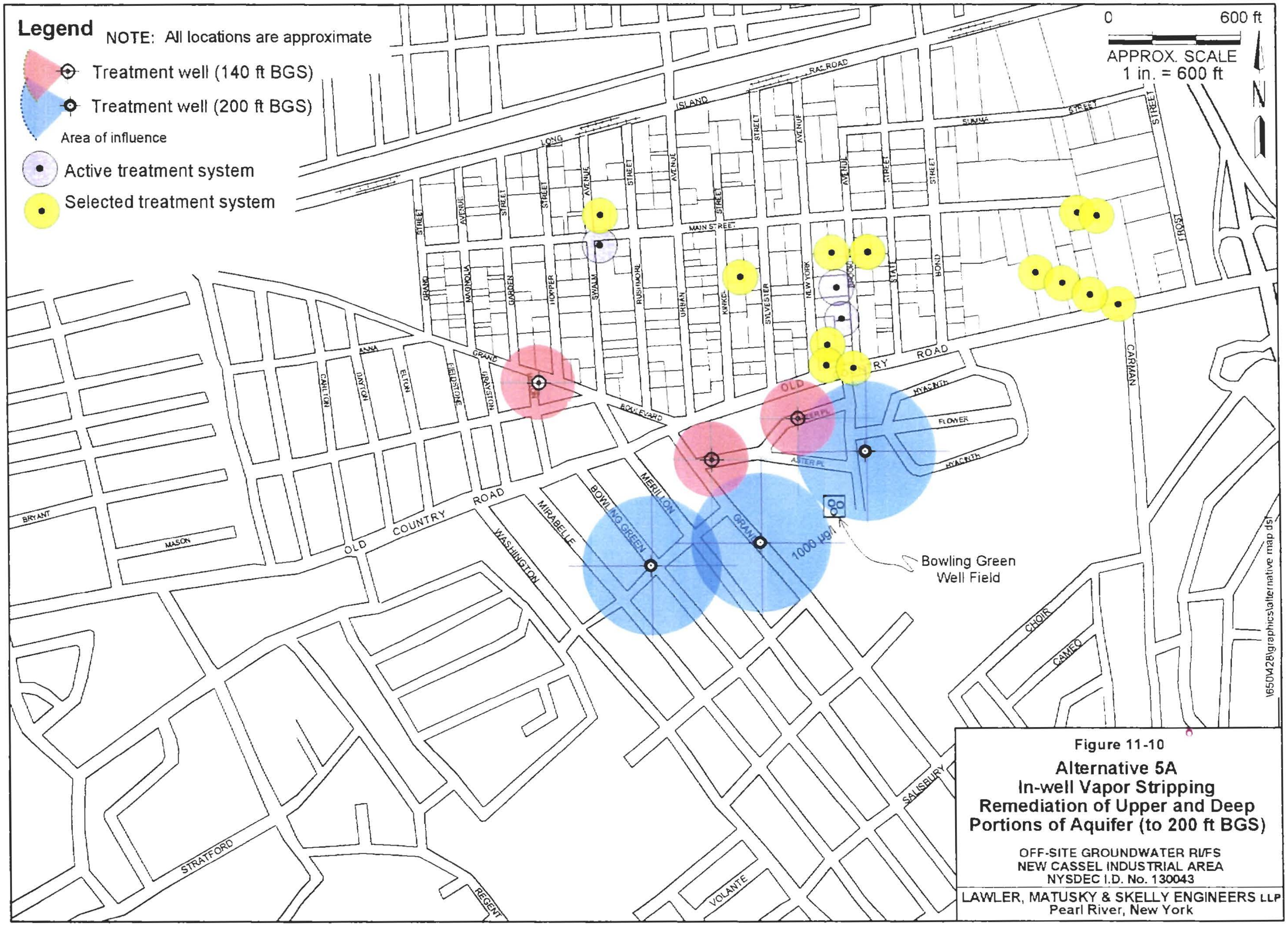

Figure 11-10
Alternative 5A
In-well Vapor Stripping
Remediation of Upper and Deep Portions of Aquifer (to 200 ft BGS)

OFF-SITE GROUNDWATER RI/FS
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

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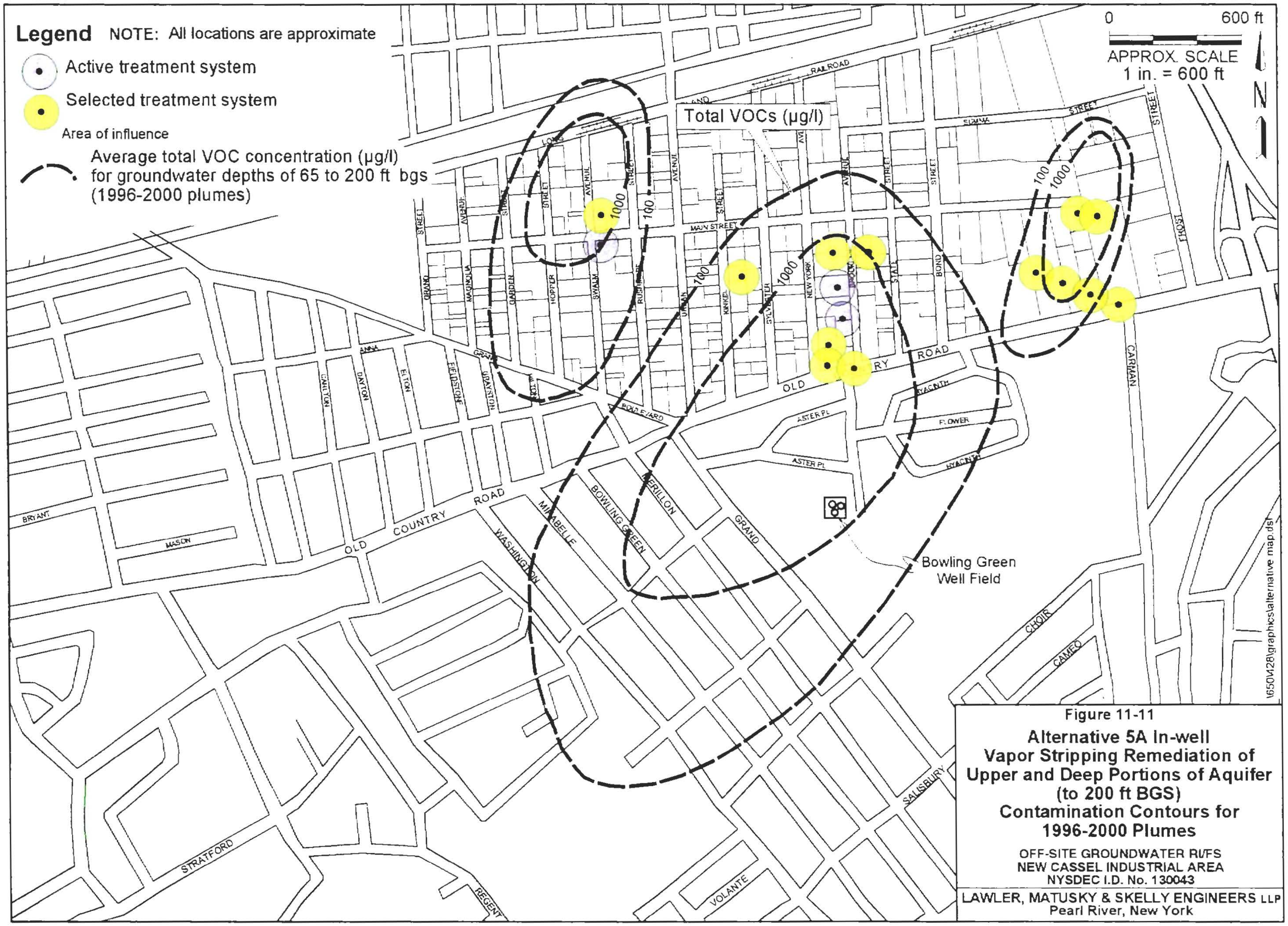

Figure 11-11
Alternative 5A In-well Vapor Stripping Remediation of Upper and Deep Portions of Aquifer (to 200 ft BGS) Contamination Contours for 1996-2000 Plumes

OFF-SITE GROUNDWATER RI/FS
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

R2-0000595

Figure 11-12
Alternative 5A In-well
Vapor Stripping Remediation of
Upper and Deep Portions of Aquifer
(to 200 ft BGS)
Treatment Well Placement
and Contamination Contours for
1996-2000 Plumes

OFF-SITE GROUNDWATER RI/FS
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
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well in Alternative 5A: 140-ft well: 175 ft; and 200-ft well: 325 ft (refer to Figure 11-12).

Prior to the final design of Alternative 5A, pilot-scale treatability studies should be performed to determine the off-site groundwater remediation timeframe and specifications of the in-well vapor stripping system. A pilot scale test can also determine optimal system configurations and design parameters, such as number/location of wells, operating pressures, and flow rates to remove contaminants from the groundwater. The results of a pilot study can also be used to evaluate the airflow distribution and vapor phase treatment approaches. In addition, potential impacts from natural iron and pH in the subsurface can be better evaluated. The results of the pilot tests will also be used to better estimate the power requirements of the system. Any potential effects from in-well vapor stripping on the Bowling Green supply wells or other remediation systems (i.e., within the NCIA) can also be evaluated. For this FS, it was assumed that a total of three in-well vapor stripping pilot tests (i.e., one per off-site contaminant plume) will be conducted under Alternative 5A. It is also assumed that a half-time system operator will be need for this alternative.

For cost estimating purposes, it is assumed that the in-well vapor stripping system will run for nine years under Alternative 5A (based on discussion with vendors and a review of case studies). This active remediation timeframe accounts for the fact that stripper wells are placed only in "hot spot" areas. The six stripper wells may actually need to run longer than estimated since contamination from outside the "hot spot" areas may be drawn to the wells during the course of remediation. Many parameters used in deriving this estimate can vary widely, which would impact the remediation time. Results of pilot tests should be used to better estimate the Alternative 5A timeframe.

11.3.6.1 ***Vapor Phase Treatment.*** For Alternative 5A, vapors from the in-well vapor stripping processes will be collected from each stripping well and transferred with a vacuum extraction blower to a GAC treatment system within each local vault. The vapors containing VOCs are passed through the GAC medium, adsorbed, and then vented to the atmosphere. GAC was selected as the optimal vapor phase treatment option for Alternative 5A based on anticipated flow rates and contaminant concentrations.

In Alternative 5A, the vapor phase flow rates to the local GAC treatment systems differ for each type of stripper well. The vapor phase flow rates (scfm, assuming 75:1 air-to-water ratio) and initial carbon usage rates are summarized for Alternative 5A in Table 11-5. As for the other in-well vapor stripping alternatives, it was assumed that as VOC concentrations in the groundwater and vapor streams are reduced over time, the carbon usage rates will also decrease. When GAC is spent (i.e., saturated with VOCs), it is transported off-site for regeneration and replaced with fresh material.

High relative humidity of the treated vapor (i.e., above about 50%) reduces the adsorption efficiency of the GAC. Thus, vacuum extraction blowers in Alternative 5A should be specified so that sufficient heat is imparted to the vapor stream and the relative humidity is maintained within satisfactory limits.

A preliminary review of the VOC constituents and respective vapor phase concentrations anticipated at each well head for the Alternative 5A scenario indicates that an emission stack will not be required. However, the ultimate configurations of the localized vapor recovery/treatment systems, including GAC usage rates over time, should be based on the final design and results from the pilot study. Air monitoring and inspection of the vapor treatment systems after startup may also determine system requirements. For cost estimating purposes, GAC was the assumed vapor phase treatment option for the in-well vapor stripping Alternative 5A. However, other vapor phase treatment options (i.e., catalytic oxidation) may be evaluated during the final design and pilot study.

11.3.6.2 ***Waste Disposal.*** Minimal trenching is required for the Alternative 5A scenario, as control of the stripper wells and vapor phase treatment occur in subsurface vaults placed near each of the treatment wells. It is estimated that approximately 310 yd^3 of nonhazardous soil will require off-site disposal from the installation of the six stripping wells and treatment vaults in Alternative 5A. All streets and areas disturbed by installation of the remediation system will be restored to original conditions.

Conservative estimates for condensate accumulation were made for Alternative 5A (refer to Table 11-5). Condensate will be periodically collected and disposed of at an approved off-site facility. Analytical sampling of the condensate and any other materials generated during remedial activities will be conducted to characterize the wastes and identify disposal options.

11.3.6.3 ***System Performance Monitoring.*** To confirm that the in-well vapor stripping system described above for Alternative 5A and natural attenuation are achieving remedial objectives, periodic groundwater sampling will be conducted. For cost estimating purposes, it was assumed that groundwater samples will be collected from 16 existing monitoring wells in the off-site area and analyzed for VOCs. In addition, it is assumed that six new well couplets will be installed at intermediate and deep depths (i.e., same layout as described for long-term monitoring in Alternative 2). The results of these analyses will be used to determine whether remedial action objectives are being satisfied, and whether changes in system design, configuration, and operation are required. In Alternative 5A, groundwater monitoring is assumed to be conducted quarterly for the first two years after remediation system startup and annually for years 3-20 (i.e., to cover life of remedial system and eleven additional years to evaluate natural attenuation). Table 11-10 itemizes the groundwater monitoring schedule for the Alternative 5A scenario.

The continued need for monitoring can be re-evaluated and possibly discontinued at any time during the project timeframe. For instance, if groundwater contaminant levels remain below the remedial action objectives for two or three consecutive sampling events, the monitoring program may be considered for discontinuation. If contaminant levels continue to exceed the remedial action objectives at the end of the 20-yr period, the monitoring program should be extended and active remediation may be re-established and/or other remedial actions may be taken.

Inspection of the GAC vapor treatment system and monitoring of any off-gas emissions will also occur as part of the overall system monitoring. It is assumed that samples of emissions will occur every two months for the first year of system operation, and semiannually after that for the duration of the alternative timeframe. As with the groundwater monitoring, the continued need for air emissions monitoring will be re-evaluated during the course of the project, and may be reduced or considered for discontinuation after system start-up.

Alternative 5A also includes the operation and maintenance, including replacement of equipment as needed, of the VOC treatment processes that are currently in-place at the Bowling Green Water District (refer to Alternative 1).

TABLE 11-10

ALTERNATIVE 5A
IN-WELL VAPOR STRIPPING
MONITORING PROGRAM SUMMARY [1]
NCIA Off-Site Groundwater

WELL[2]	Plume Location	DEPTH[3]	SAMPLING SCHEDULE[4] YEARS 1-2	SAMPLING SCHEDULE[5] YEARS 3-20
N-10477	West	57 ft (shallow)	X	X
N-10478	West	121 ft (intermediate)	X	X
N-11851	West	65 ft (shallow)	X	X
NRMW-4	West	70 ft (intermediate)	X	X
N-11848	West	60 ft (shallow)	X	X
N-11860	Central	60 ft (shallow)	X	X
N-11862	Central	60 ft (shallow)	X	X
N-10476	Central	130 ft (deep)	X	X
N-11861	Central	60 ft (shallow)	X	X
EW-1B	Central/East	164 ft (deep)	X	X
EW-1C	Central/East	516 ft (deep)	X	X
EW-2B	Central/East	142 ft (deep)	X	X
EW-2C	Central/East	514 ft (deep)	X	X
NRMW-1	Central/East	70 ft (intermediate)	X	X
N-9939	Central/East	74 ft (intermediate)	X	X
N-10329	East	57 ft (shallow)	X	X
6 proposed new well couplets[6]		**intermediate/deep**	X	X
		TOTAL:	**28**	**28**

X - Sampling is recommended

1 - This is a preliminary monitoring program developed for cost estimation purposes; the final monitoring program will be established during the remedial design phase; depending on the sample results, the schedule may be modified.

2 - Well locations are depicted on Figures 3-4, 3-5, and 3-6 of the RI report.

3 - Shallow groundwater exists at depths between the water table and 64-ft; intermediate groundwater exists from approximately 65-124 ft bgs deep groundwater exists at depths of 125 ft bgs or greater.

4 - All samples will be analyzed for VOCs quarterly.

5 - All samples will be analyzed for VOCs annually.

6 - For costing purposes, it is assumed that 6 new monitoring well locations will be established at locations downgradient and sidegradient of existing off-site plumes to monitor future VOC migration. It is assumed that monitoring wells will be installed at intermediate and deep depths as follows:

A total of 3 intermediate wells will be installed to 70 ft bgs; the remaining 3 intermediate wells are to be installed to a depth of 100 ft bgs

A total of 3 deep wells will be installed to 200 ft bgs; the 3 remaining deep wells are to be installed to a depth of 250 ft bgs.

11.3.7 **Alternative 5B: Remediation of Upper and Deep Portions of Aquifer (to 200 ft bgs) with Groundwater Extraction / Centralized Air Stripping and Vapor Treatment / Effluent Re-Injection**

Alternative 5B is similar to Alternative 4B presented above but includes treatment of the contaminated groundwater in the upper and deep portions of the aquifer. It addresses "hot-spot" areas within the off-site contaminant plumes and assumes that natural attenuation will remediate a portion of the off-site groundwater over time. As discussed above, active contaminant source removal and groundwater remediation is in-place or planned at 13 source sites within the NCIA. Figure 11-13 shows approximate locations of the extraction wells and the centralized treatment structure for Alternative 5B. On Figure 11-13, average total VOC plumes were derived from contaminant plume maps for groundwater at depths of 65 to 200 ft bgs. As shown, four extraction wells (one 80-ft well and three 150-ft wells) are included under Alternative 5B. Details and construction of the extraction wells used in Alternative 5B are as described in Alternative 4B. As in Alternative 4B, the bottom 20 ft of each extraction well will be screened. It is assumed under Alternative 5B that the 150-ft extraction wells will remove groundwater contamination from depths as great as 200 ft bgs. This assumption, and final extraction well details, should be confirmed during pilot studies and in the design phase of work. The central structure (approximately 3200 sf) will likely be located to the east of the Bowling Green supply wells (same location as central treatment building described for other pump and treat scenarios). The structure size and location shall be confirmed in the final design.

Table 11-7 summarizes the system components for Alternative 5B. As for the scenarios presented for the other pump and treat alternatives, aquifer pump tests and pilot studies (i.e., one per plume) in the design phase of work will more accurately determine the construction details and placement of each of the extraction wells and recharge wet wells in Alternative 5B.

As shown in Table 11-7, the scenario presented under Alternative 5B will utilize four wet wells with approximate depths of 15 ft bgs for re-injection of treated groundwater to the subsurface. The wet wells will be located beside the central treatment building. Re-injection of treated water into the subsurface will require that all relevant discharge

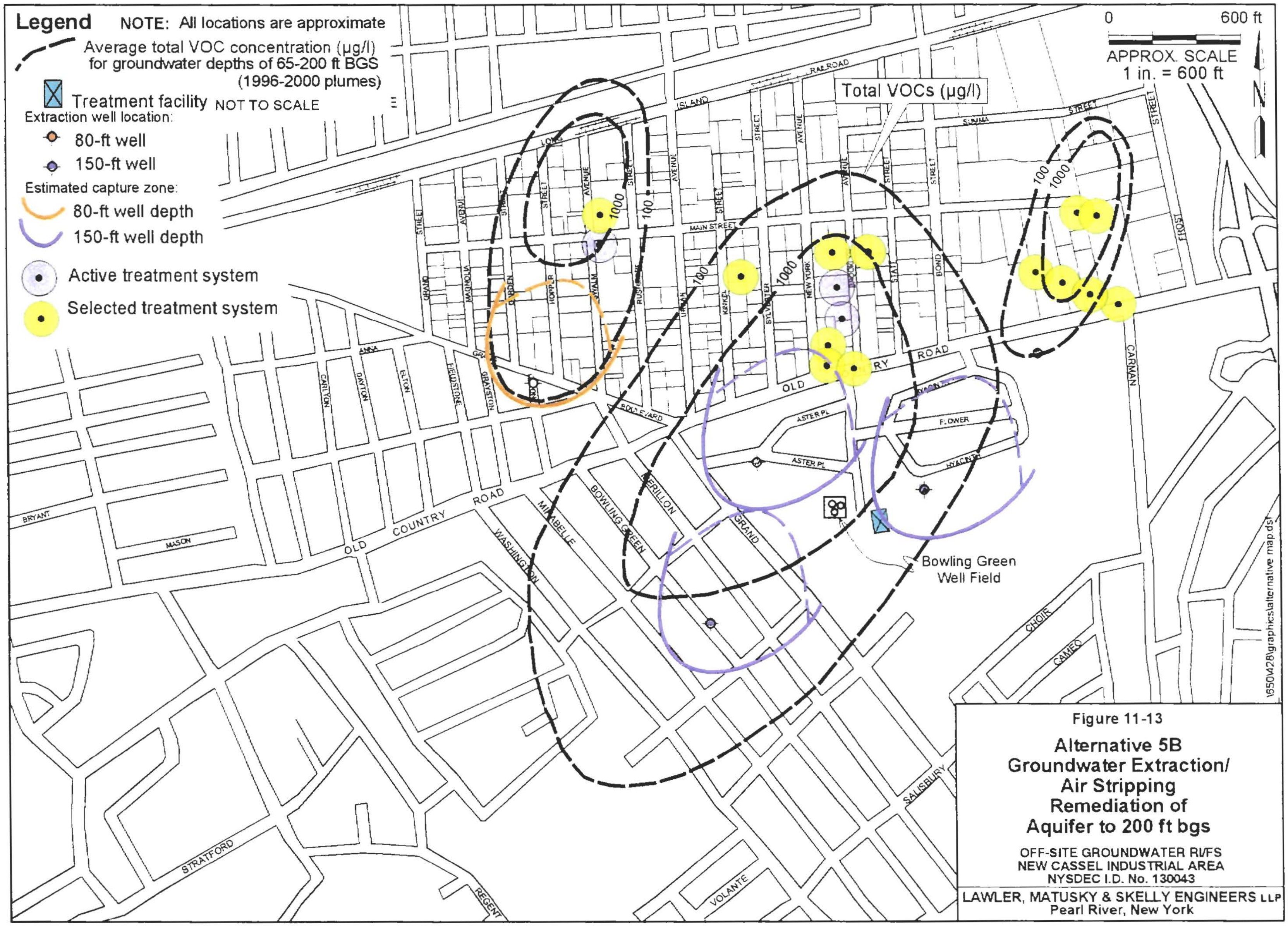

Figure 11-13

Alternative 5B Groundwater Extraction/ Air Stripping Remediation of Aquifer to 200 ft bgs

OFF-SITE GROUNDWATER RI/FS
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

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standards are achieved. In addition, local or state permits may be required. The treatability/pilot studies will help to evaluate the ability of the treatment processes to meet discharge requirements near the treatment building. Pilot studies can also help determine reinjection schedules and potential impacts of reinjection on the Bowling Green supply wells or other remediation systems (i.e., within the NCIA). If discharge limitations are not satisfied, polishing via carbon adsorption may be necessary. The treated effluent will be periodically monitored to ensure that discharge limits are met.

It is estimated that approximately 20 yd^3 of nonhazardous soil will require off-site disposal from the installation of the extraction wells in Alternative 5B. In addition, approximately 14,800 ft^2 of asphalt will also be excavated and require off-site disposal under Alternative 5B. All streets and areas disturbed by trenching and installation of the remediation system will be restored to original conditions. It is estimated that approximately 3700 l.f. of trenching are required under Alternative 5B.

For Alternative 5B, it is assumed that a half-time operator will be needed to operate, supervise, and monitor the treatment system. Operation and maintenance items described for the other pump and treat alternatives (i.e., electricity; periodic repair and replacement of system parts/components; routine operator inspection of the system; and system monitoring) also apply to Alternative 5B. System inspection, maintenance, and monitoring activities consist of assessments of the remediation system, cleaning and maintaining the components, and collection of real-time air measurements, as required.

For cost estimating purposes in this FS, an estimated timeframe for active remediation of 12 years was used for Alternative 5B. This 12-year timeframe accounts for the fact that extraction wells are placed only in "hot spot" areas. The four extraction wells may actually need to run longer than estimated since contamination from outside the "hot spot" areas may be drawn to the wells during the course of remediation. Many parameters used in deriving this estimate can vary widely, which would impact the remediation time. Results of pilot tests should be used to better estimate the Alternative 5B timeframe.

11.3.7.1 ***System Performance Monitoring.*** The long-term monitoring program included in this alternative is intended to assess the effectiveness of groundwater extraction and treatment and natural attenuation on the contaminant levels in the aquifer over time. Monitoring will consist of system performance monitoring and effluent quality monitoring. For Alternative 5B, during the first three months that the treatment plant is in operation, VOC samples will be collected from the equalization tank and the effluent pipe once per week to evaluate the efficiency and effectiveness of the treatment plant. The effluent sample analysis will be used to demonstrate that all discharge requirements are being met. For the remainder of the active remediation timeframe, VOC sampling at each of the influent pipes and the single effluent pipe at the treatment plant will be collected once per month. Samples will be analyzed for conventional parameters (e.g., pH, solids, and alkalinity) as well as VOC content. As reference, Table 11-8 lists the effluent limitations (Class GA) for the VOCs of concern.

To confirm that the groundwater extraction/air stripping system described above for Alternative 5B and natural attenuation are achieving remedial objectives, periodic groundwater sampling will be conducted. For cost estimating purposes, it was assumed that groundwater samples will be collected from 16 existing monitoring wells in the off-site area and analyzed for VOCs. In addition, it is assumed that six new well couplets will be installed at intermediate and deep depths (i.e., same layout as described for long-term monitoring in Alternative 2). The results of these analyses will be used to determine whether remedial action objectives are being satisfied, and whether changes in system design, configuration, and operation are required. In Alternative 5B, groundwater monitoring is assumed to be conducted quarterly for two years after remediation system startup and annually for year 3-20 to cover the remainder of the estimated life of the active remediation and an additional eight years to evaluate natural attenuation. Table 11-11 itemizes the groundwater monitoring schedule for the Alternative 5B scenario.

The continued need for groundwater monitoring can be re-evaluated and possibly discontinued at any time during the project timeframe. For instance, if groundwater contaminant levels remain below the site remedial action objectives for two or three consecutive sampling events, the monitoring program may be considered for discontinuation. If contaminant levels continue to exceed the remedial action objectives at the end of the 20-yr period, the monitoring program should be extended and active remediation may be re-established and/or other remedial actions may be taken.

Inspection of the GAC vapor treatment system and monitoring of any off-gas emissions will also occur as part of the overall system monitoring. It is assumed that samples of emissions will occur every two months for the first year of system operation, and

TABLE 11-11

ALTERNATIVE 5B
GROUNDWATER EXTRACTION / AIRSTRIPPING
MONITORING PROGRAM SUMMARY [1]

NCIA Off-Site Groundwater

WELL[2]	Plume Location	DEPTH[3]	SAMPLING SCHEDULE[4] YEARS 1-2	SAMPLING SCHEDULE[5] YEARS 3-20
N-10477	West	57 ft (shallow)	X	X
N-10478	West	121 ft (intermediate)	X	X
N-11851	West	65 ft (shallow)	X	X
NRMW-4	West	70 ft (intermediate)	X	X
N-11848	West	60 ft (shallow)	X	X
N-11860	Central	60 ft (shallow)	X	X
N-11862	Central	60 ft (shallow)	X	X
N-10476	Central	130 ft (deep)	X	X
N-11861	Central	60 ft (shallow)	X	X
EW-1B	Central/East	164 ft (deep)	X	X
EW-1C	Central/East	516 ft (deep)	X	X
EW-2B	Central/East	142 ft (deep)	X	X
EW-2C	Central/East	514 ft (deep)	X	X
NRMW-1	Central/East	70 ft (intermediate)	X	X
N-9939	Central/East	74 ft (intermediate)	X	X
N-10329	East	57 ft (shallow)	X	X
6 proposed new well couplets[6]		**intermediate/deep**	X	X
		TOTAL:	**28**	**28**

X - Sampling is recommended.
1 - This is a preliminary monitoring program developed for cost estimation purposes; the final monitoring program will be established during the remedial design phase; depending on the sample results, the schedule may be modified.
2 - Well locations are depicted on Figures 3-4, 3-5, and 3-6 of the RI report.
3 - Shallow groundwater exists at depths between the water table and 64-ft; intermediate groundwater exists from approximately 65-124 ft bgs. deep groundwater exists at depths of 125 ft bgs or greater.
4 - All samples will be analyzed for VOCs quarterly
5 - All samples will be analyzed for VOCs annually
6 - For costing purposes, it is assumed that 6 new monitoring well locations will be established at locations downgradient and sidegradient of existing off-site plumes to monitor future VOC migration It is assumed that monitoring wells will be installed at intermediate and deep depths as follows:
    A total of 3 intermediate wells will be installed to 70 ft bgs; the remaining 3 intermediate wells are to be installed to a depth of 100 ft bgs.
    A total of 3 deep wells will be installed to 200 ft bgs; the 3 remaining deep wells are to be installed to a depth of 250 ft bgs.

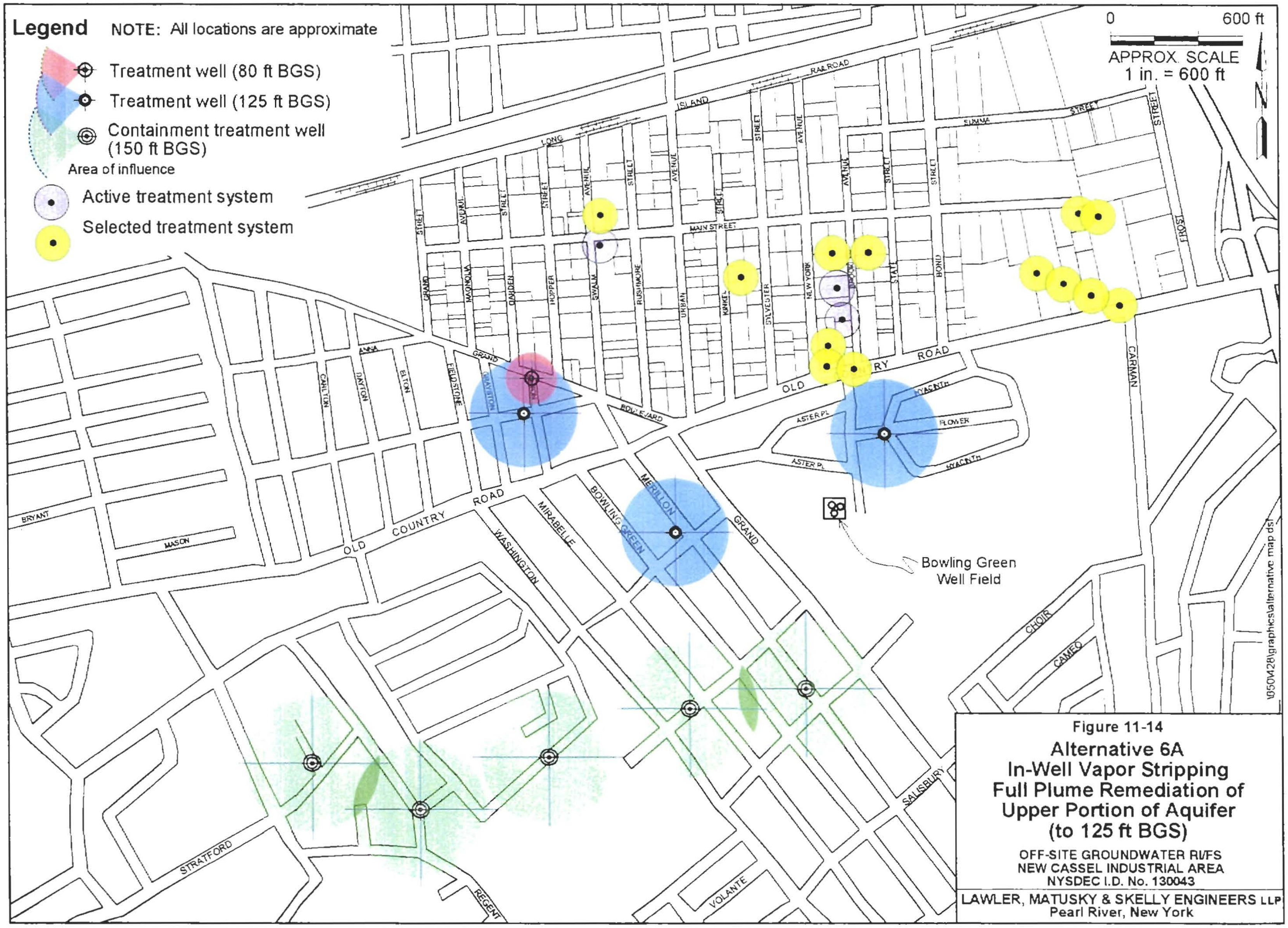
semiannually after that for the duration of the alternative timeframe. As with the groundwater monitoring, the continued need for air emissions monitoring will be re-evaluated during the course of the project, and may be reduced or considered for discontinuation after system start-up.

Alternative 5B also includes the operation and maintenance, including replacement of equipment as needed, of the VOC treatment processes that are currently in-place at the Bowling Green Water District (refer to Alternative 1).

11.3.8 Alternative 6A: Full Plume Remediation of Upper Portion of Aquifer (to 125 ft bgs) with In-Well Vapor Stripping / Localized Vapor Treatment

Alternative 6A is similar to Alternative 4A presented above (i.e., addresses contamination in the upper portion of the aquifer with in-well vapor stripping) but includes the full-scale treatment of contaminated off-site groundwater to the designated depths to achieve Class GA groundwater criteria. As discussed above, active source removal and groundwater remediation is in-place or planned at 13 source sites within the NCIA. Figure 11-14 shows approximate locations of the stripping wells for Alternative 6A. Note that in addition to 80-ft and 125-ft treatment wells, containment stripper wells (installed to 150-ft bgs) are also employed under this alternative along the southern extent of the contamination (i.e., curtain wall) to achieve remedial objectives. Figure 11-15 shows average total VOC contaminant plumes (years 1996 – 2000) for depths of 65 – 125 ft bgs. Figure 11-16 displays treatment well locations and radii of influence and portions of the off-site plumes addressed in Alternative 6A.

Alternative 6A includes the treatment of the contaminated off-site groundwater via nine in-well vapor stripping wells. Alternative 6A includes the installation of one 80-ft stripper well, three 125-ft stripper wells, and five 150-ft containment wells. Table 11-5 summarizes the system components and operation parameters for Alternative 6A. As for the other in-well vapor stripping scenarios presented in this FS, pilot studies and field measurements in the design phase of work will more accurately determine the construction details and placement of each of the in-well vapor stripping wells in Alternative 6A, along with the specific groundwater circulation/treatment patterns expected to result.


Legend
NOTE: All locations are approximate
Treatment well (80 ft BGS)
Treatment well (125 ft BGS)
Containment treatment well (150 ft BGS)
Area of influence
Active treatment system
Selected treatment system
0 600 ft
APPROX. SCALE
1 in. = 600 ft
Bowling Green Well Field
Figure 11-14
Alternative 6A
In-Well Vapor Stripping
Full Plume Remediation of
Upper Portion of Aquifer
(to 125 ft BGS)
OFF-SITE GROUNDWATER RI/FS
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043
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Pearl River, New York

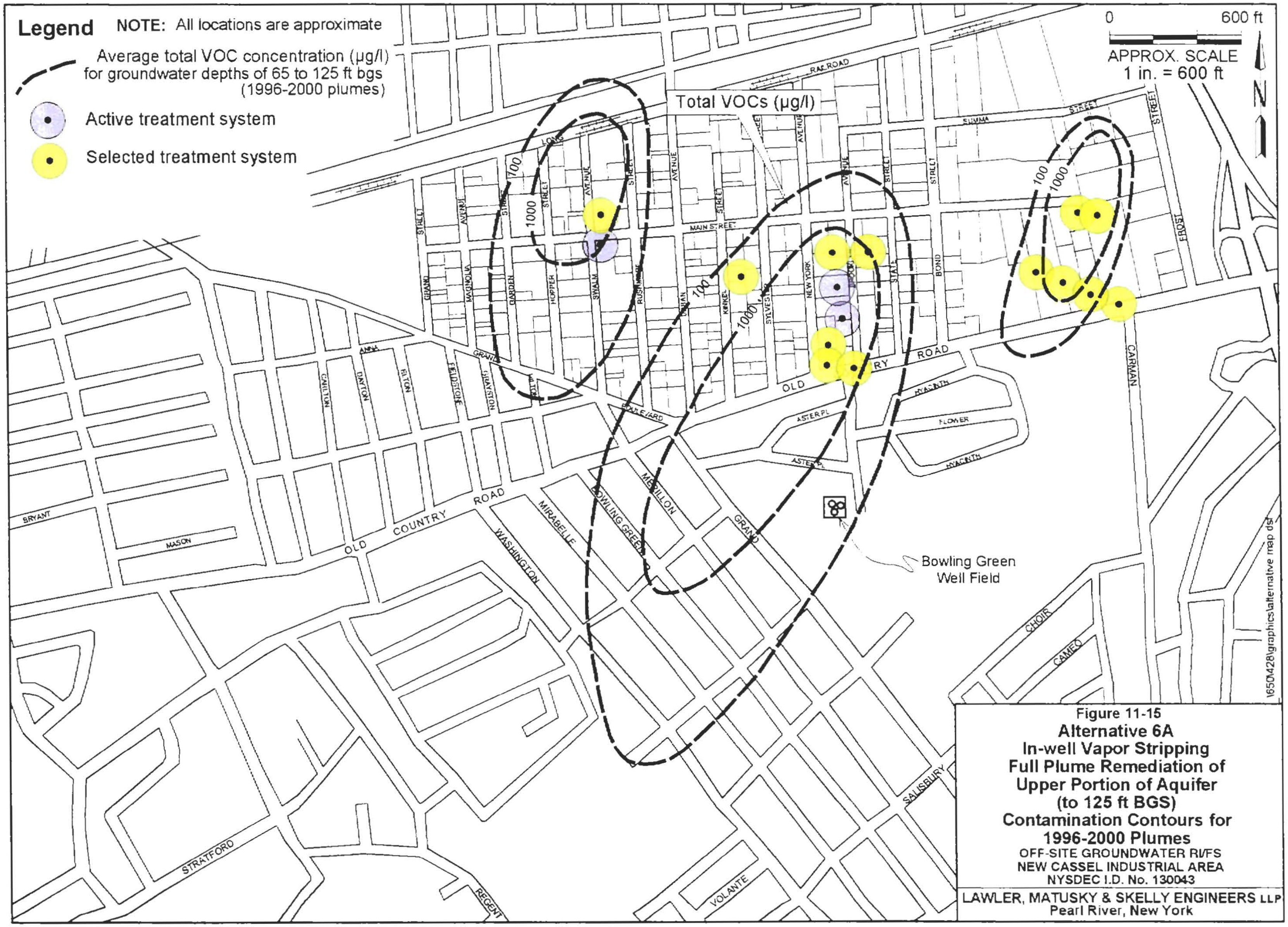

Figure 11-15
Alternative 6A
In-well Vapor Stripping
Full Plume Remediation of Upper Portion of Aquifer (to 125 ft BGS)
Contamination Contours for 1996-2000 Plumes

OFF-SITE GROUNDWATER RI/FS
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Legend
NOTE: All locations are approximate
Treatment well (80 ft BGS)
Treatment (125 ft BGS)
Containment treatment well (150 ft BGS)
Area of influence
Active treatment system
Selected treatment system
Average total VOC concentration (µg/l) for groundwater depths of 65 to 125 ft bgs (1996-2000 plumes)
Total VOCs (µg/l)
0
600 ft
APPROX. SCALE
1 in. = 600 ft
N
Bowling Green Well Field
100
1000
OLD COUNTRY ROAD
RAILROAD
MAIN STREET
BOULEVARD
MIRABELLE
WASHINGTON
BOWLING GREEN
GRAND
STRATFORD
REGENT
VOLANTE
SALISBURY
CHOIR
CAMEO
CARMAN
FROST
FLOWER
HYACINTH
ASTER PL
BRYANT
MASON
Figure 11-16
Alternative 6A
In-well Vapor Stripping
Full Plume Remediation of
Upper Portion of Aquifer (to 125 ft BGS)
Treatment Well Placement
and Contamination Contours for
1996-2000 Plumes
OFF-SITE GROUNDWATER RI/FS
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043
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Pearl River, New York

R2-0000609

Based on the treatment technology and aquifer characteristics in the off-site area, the estimated groundwater flow rate in the 80-ft well is 40 gpm, the flow rate in the 125-ft wells is 10 gpm, and the flow rate in each containment treatment well is 10 gpm. According to venders of the in-well vapor stripping technology, the following radii of influence can be achieved for each type of stripping well in Alternative 6A: containment well: 315 ft; 80-ft well: 120 ft; and 125-ft well: 250 ft (refer to Figure 11-16).

Prior to the final design of Alternative 6A, pilot-scale treatability studies should be performed to determine the off-site groundwater remediation timeframe and specifications of the in-well vapor stripping system. A pilot scale test can also determine optimal system configurations and design parameters, such as number/location of wells, operating pressures, and flow rates to remove contaminants from the groundwater. The results of a pilot study can also be used to evaluate the airflow distribution and vapor phase treatment approaches. In addition, potential impacts from natural iron and pH in the subsurface can be better evaluated. The results of the pilot tests will also be used to better estimate the power requirements of the system. Any potential effects from in-well vapor stripping on the Bowling Green supply wells or other remediation systems (i.e., within the NCIA) can also be evaluated. For this FS, it was assumed that a total of three in-well vapor stripping pilot tests (i.e., one per off-site contaminant plume) will be conducted under Alternative 6A. It was also assumed that a full-time in-well vapor stripping system operator will be required. For the Alternative 6A cost estimate, a project life of 5 years was assumed.

11.3.8.1 ***Vapor Phase Treatment.*** For Alternative 6A, vapors from the in-well vapor stripping processes will be collected from each stripping well and transferred with a vacuum extraction blower to a GAC treatment system within each local vault. The vapors containing VOCs are passed through the GAC medium, adsorbed, and then vented to the atmosphere. GAC was selected as the optimal vapor phase treatment option for Alternative 6A based on anticipated flow rates and contaminant concentrations.

In Alternative 6A, the vapor phase flow rates to the local GAC treatment systems differ for each type of stripper well (i.e., 150-ft containment well, 80-ft well, and 125-ft well). The vapor phase flow rates (scfm, assuming 75:1 air-to-water ratio) and initial carbon usage rates are summarized for Alternative 6A in Table 11-5. As for the other in-well vapor stripping alternatives, it was assumed that as VOC concentrations in the groundwater and vapor streams are reduced over time, the carbon usage rates will also decrease. When GAC is spent (i.e., saturated with VOCs), it is transported off-site for regeneration and replaced with fresh material.

High relative humidity of the treated vapor (i.e., above about 50%) reduces the adsorption efficiency of the GAC. Thus, vacuum extraction blowers in Alternative 6A should be specified so that sufficient heat is imparted to the vapor stream and the relative humidity is maintained within satisfactory limits.

A preliminary review of the VOC constituents and respective vapor phase concentrations anticipated at each well head for the Alternative 6A scenario indicates that an emission stack will not be required. However, the ultimate configurations of the localized vapor recovery/treatment systems, including GAC usage rates over time, should be based on the final design and results from the pilot study. Air monitoring and inspection of the vapor treatment systems after startup may also determine system requirements. For cost estimating purposes, GAC was the assumed vapor phase treatment option for the in-well vapor stripping Alternative 6A. However, other vapor phase treatment options (i.e., catalytic oxidation) may be evaluated during the final design and pilot study.

11.3.8.2 ***Waste Disposal.*** Minimal trenching is required for the Alternative 6A scenario, as control of the stripper wells and vapor phase treatment occur in subsurface vaults placed near each of the treatment wells. It is estimated that approximately 470 yd^3 of nonhazardous soil will require off-site disposal from the installation of the nine stripping wells and treatment vaults in Alternative 6A. All streets and areas disturbed by installation of the remediation system will be restored to original conditions.

Conservative estimates for condensate accumulation were made for Alternative 6A (refer to Table 11-5). Condensate will be periodically collected and disposed of at an approved off-site facility. Analytical sampling of the condensate and any other materials generated during remedial activities will be conducted to characterize the wastes and identify disposal options.

11.3.8.3 ***System Performance Monitoring.*** To confirm that the in-well vapor stripping system described above for Alternative 6A is achieving remedial objectives, periodic groundwater sampling will be conducted. For cost estimating purposes, it was assumed that groundwater samples will be collected from 16 existing monitoring wells in the off-site area and analyzed for VOCs. In addition, it is assumed that six new well couplets will be installed at intermediate and deep depths (i.e., same layout as described for long-term monitoring in Alternative 2). The results of these analyses will be used to determine whether remedial action objectives are being satisfied, and whether changes in system design, configuration, and operation are required. Table 11-12 itemizes the groundwater monitoring schedule for the Alternative 6A scenario.

The continued need for monitoring can be re-evaluated and possibly discontinued at any time during the project timeframes. For instance, if groundwater contaminant levels remain below the remedial action objectives for two or three consecutive sampling events, the monitoring program may be considered for discontinuation. If contaminant levels continue to exceed the remedial action objectives at the end project life, the monitoring program, and system operation, will be extended and/or other remedial actions may be taken.

Inspection of the GAC vapor treatment system and monitoring of any off-gas emissions will also occur as part of the overall system monitoring. It is assumed that samples of emissions will occur every two months for the first year of system operation, and semiannually after that for the duration of the alternative timeframe. As with the groundwater monitoring, the continued need for air emissions monitoring will be re-evaluated during the course of the project, and may be reduced or considered for discontinuation after system start-up.

Alternative 6A also includes the operation and maintenance, including replacement of equipment as needed, of the VOC treatment processes that are currently in-place at the Bowling Green Water District (refer to Alternative 1).

11.3.9 Alternative 6B: Full Plume Remediation of Upper Portion of Aquifer (to 125 ft bgs) with Groundwater Extraction / Centralized Air Stripping and Vapor Treatment / Effluent Re-Injection

Alternative 6B is similar to Alternative 4B presented above (i.e., addresses contamination in the upper portion of the aquifer with a pump and treat system) but includes the full-scale treatment of contaminated off-site groundwater to the designated depths to achieve

TABLE 11-12

ALTERNATIVE 6A
IN-WELL VAPOR STRIPPING
MONITORING PROGRAM SUMMARY [1]
NCIA Off-Site Groundwater

WELL [2]	Plume Location	DEPTH [3]	SAMPLING SCHEDULE [4] YEARS 1-2	SAMPLING SCHEDULE [5] YEARS 3-20
N-10477	West	57 ft (shallow)	X	X
N-10478	West	121 ft (intermediate)	X	X
N-11851	West	65 ft (shallow)	X	X
NRMW-4	West	70 ft (intermediate)	X	X
N-11848	West	60 ft (shallow)	X	X
N-11860	Central	60 ft (shallow)	X	X
N-11862	Central	60 ft (shallow)	X	X
N-10476	Central	130 ft (deep)	X	X
N-11861	Central	60 ft (shallow)	X	X
EW-1B	Central/East	164 ft (deep)	X	X
EW-1C	Central/East	516 ft (deep)	X	X
EW-2B	Central/East	142 ft (deep)	X	X
EW-2C	Central/East	514 ft (deep)	X	X
NRMW-1	Central/East	70 ft (intermediate)	X	X
N-9939	Central/East	74 ft (intermediate)	X	X
N-10329	East	57 ft (shallow)	X	X
6 proposed new well couplets [6]		**intermediate/deep**	X	X
		TOTAL:	**28**	**28**

X - Sampling is recommended.
1 - This is a preliminary monitoring program developed for cost estimation purposes; the final monitoring program will be established during the remedial design phase; depending on the sample results, the schedule may be modified.
2 - Well locations are depicted on Figures 3-4, 3-5, and 3-6 of the RI report.
3 - Shallow groundwater exists at depths between the water table and 64-ft; intermediate groundwater exists from approximately 65-124 ft bgs. deep groundwater exists at depths of 125 ft bgs or greater.
4 - All samples will be analyzed for VOCs quarterly.
5 - All samples will be analyzed for VOCs annually.
6 - For costing purposes, it is assumed that 6 new monitoring well locations will be established at locations downgradient and sidegradient of existing off-site plumes to monitor future VOC migration. It is assumed that monitoring wells will be installed at intermediate and deep depths as follows:
A total of 3 intermediate wells will be installed to 70 ft bgs; the remaining 3 intermediate wells are to be installed to a depth of 100 ft bgs.
A total of 3 deep wells will be installed to 200 ft bgs; the 3 remaining deep wells are to be installed to a depth of 250 ft bgs.

Class GA groundwater criteria. As discussed above, active contaminant source removal and groundwater remediation is in-place or planned at 13 source sites within the NCIA. Figure 11-17 shows approximate locations of the extraction wells and the centralized treatment structure for Alternative 6B. On Figure 11-17, average total VOC plumes were derived from contaminant plume maps for groundwater at depths of 65 to 125 ft bgs. As shown, twelve extraction wells (one 80-ft well and eleven 110-ft wells) are included under Alternative 6B. Details and construction of the extraction wells used in Alternative 6B are as described in the other pump and treat alternatives. The bottom 20 ft of each extraction well will be screened. The central structure (approximately 4000 sf) will likely be located to the east of the Bowling Green supply wells (same location as central treatment building described for other pump and treat alternatives). The structure size and location shall be confirmed in the final design.

Table 11-7 summarizes the system components for Alternative 6B. As for the other groundwater extraction/air stripping scenarios presented in this FS, aquifer pump tests and pilot studies (i.e., one per plume) in the design phase of work will more accurately determine the construction details and placement of each of the extraction wells and recharge wet wells in Alternative 6B.

As shown in Table 11-7, the scenarios presented under Alternative 6B will utilize seven wet wells with approximate depths of 15 ft bgs for re-injection of treated groundwater to the subsurface. The wet wells will be located beside the central treatment building. Re-injection of treated water into the subsurface will require that all relevant discharge standards are achieved. In addition, local or state permits may be required. The treatability/pilot studies will help to evaluate the ability of the treatment processes to meet discharge requirements near the treatment building. Pilot studies can also help determine reinjection schedules and potential impacts of reinjection on the Bowling Green supply wells or other remediation systems (i.e., within the NCIA). If discharge limitations are not satisfied, polishing via carbon adsorption may be necessary. The treated effluent will be periodically monitored to ensure that discharge limits are met.

It is estimated that approximately 40 yd^3 of nonhazardous soil will require off-site disposal from the installation of the extraction wells in Alternative 6B. In addition, approximately 38,000 ft^2 of asphalt will also be excavated and require off-site disposal under Alternative 6B. All streets and areas disturbed by trenching and installation of the

Figure 11-17

Alternative 6B Groundwater Extraction/ Air Stripping Full Plume Remediation of Aquifer to 125 ft bgs

OFF-SITE GROUNDWATER RI/FS
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

R2-0000615

remediation system will be restored to original conditions. It is estimated that approximately 9,400 l.f. of trenching are required under Alternative 6B.

For Alternative 6B, it is assumed that a full-time operator will be needed to operate, supervise, and monitor the treatment system. Operation and maintenance items described for the other pump and treat alternatives (i.e., electricity; periodic repair and replacement of system parts/components; routine operator inspection of the system; and system monitoring) also apply to Alternative 6B. System inspection, maintenance, and monitoring activities consist of assessments of the remediation system, cleaning and maintaining the components, and collection of real-time air measurements, as required.

For cost estimating purposes in this FS, a project life of 7 years is assumed for Alternative 6B. This estimated remediation time should be confirmed after an aquifer pump test establishes better values for the hydrological parameters.

11.3.9.1 ***System Performance Monitoring.*** The long-term monitoring program included in this alternative is intended to assess the effectiveness of groundwater extraction and treatment on the contaminant levels in the aquifer over time. Monitoring will consist of system performance monitoring and effluent quality monitoring. For Alternative 6B, during the first three months that the treatment plant is in operation, VOC samples will be collected from the equalization tank and the effluent pipe once per week to evaluate the efficiency and effectiveness of the treatment plant. The effluent sample analysis will be used to demonstrate that all discharge requirements are being met. For the remainder of the project lives of the alternatives, VOC sampling at each of the influent pipes and the single effluent pipe at the treatment plant will be collected once per month. Samples will be analyzed for conventional parameters (e.g., pH, solids, and alkalinity) as well as VOC content. As reference, Table 11-8 lists the effluent limitations (Class GA) for the VOCs of concern.

To confirm that the groundwater extraction/air stripping system described above for Alternative 6B is achieving remedial objectives, periodic groundwater sampling will be conducted. For cost estimating purposes, it was assumed that groundwater samples will be collected from 16 existing monitoring wells in the off-site area and analyzed for VOCs. In addition, it is assumed that six new well couplets will be installed at intermediate and deep depths (i.e., same layout as described for long-term monitoring in

Alternative 2). The results of these analyses will be used to determine whether remedial action objectives are being satisfied, and whether changes in system design, configuration, and operation are required. Table 11-13 itemizes the groundwater monitoring schedule for the Alternative 6B scenario.

The continued need for groundwater monitoring can be re-evaluated and possibly discontinued at any time during the project timeframe. For instance, if groundwater contaminant levels remain below the site remedial action objectives for two or three consecutive sampling events, the monitoring program may be considered for discontinuation. If contaminant levels continue to exceed the remedial action objectives at the end of the project life, the monitoring program, and system operation, will be extended and/or other remedial actions may be taken.

Inspection of the GAC vapor treatment system and monitoring of any off-gas emissions will also occur as part of the overall system monitoring. It is assumed that samples of emissions will occur every two months for the first year of system operation, and semiannually after that for the duration of the alternative timeframe. As with the groundwater monitoring, the continued need for air emissions monitoring will be re-evaluated during the course of the project, and may be reduced or considered for discontinuation after system start-up.

Alternative 6B also includes the operation and maintenance, including replacement of equipment as needed, of the VOC treatment processes that are currently in-place at the Bowling Green Water District (refer to Alternative 1).

11.3.10 Alternative 7A: Full Plume Remediation of Upper and Deep Portions of Aquifer (to 200 ft bgs) with In-Well Vapor Stripping / Localized Vapor Treatment

Alternative 7A is similar to Alternative 5A presented above (i.e., addresses contamination in the upper and deep portions of the aquifer with in-well vapor stripping) but includes the full-scale treatment of contaminated off-site groundwater to the designated depths to achieve Class GA groundwater criteria. As discussed above, active source removal and groundwater remediation is in-place or planned at 13 source sites within the NCIA. Figure 11-18 shows approximate locations of the stripping wells for Alternative 7A.

TABLE 11-13

ALTERNATIVE 6B
GROUNDWATER EXTRACTION / AIRSTRIPPING
MONITORING PROGRAM SUMMARY [1]
NCIA Off-Site Groundwater

WELL[2]	Plume Location	DEPTH[3]	SAMPLING SCHEDULE[4] YEARS 1-2	SAMPLING SCHEDULE[5] YEARS 3-20
N-10477	West	57 ft (shallow)	X	X
N-10478	West	121 ft (intermediate)	X	X
N-11851	West	65 ft (shallow)	X	X
NRMW-4	West	70 ft (intermediate)	X	X
N-11848	West	60 ft (shallow)	X	X
N-11860	Central	60 ft (shallow)	X	X
N-11862	Central	60 ft (shallow)	X	X
N-10476	Central	130 ft (deep)	X	X
N-11861	Central	60 ft (shallow)	X	X
EW-1B	Central/East	164 ft (deep)	X	X
EW-1C	Central/East	516 ft (deep)	X	X
EW-2B	Central/East	142 ft (deep)	X	X
EW-2C	Central/East	514 ft (deep)	X	X
NRMW-1	Central/East	70 ft (intermediate)	X	X
N-9939	Central/East	74 ft (intermediate)	X	X
N-10329	East	57 ft (shallow)	X	X
6 proposed new well couplets[6]		**intermediate/deep**	X	X
		TOTAL:	**28**	**28**

X - Sampling is recommended.
1 - This is a preliminary monitoring program developed for cost estimation purposes; the final monitoring program will be established during the remedial design phase; depending on the sample results, the schedule may be modified.
2 - Well locations are depicted on Figures 3-4, 3-5, and 3-6 of the RI report
3 - Shallow groundwater exists at depths between the water table and 64-ft; intermediate groundwater exists from approximately 65-124 ft bgs. deep groundwater exists at depths of 125 ft bgs or greater.
4 - All samples will be analyzed for VOCs quarterly.
5 - All samples will be analyzed for VOCs annually
6 - For costing purposes, it is assumed that 6 new monitoring well locations will be established at locations downgradient and sidegradient of existing off-site plumes to monitor future VOC migration. It is assumed that monitoring wells will be installed at intermediate and deep depths as follows:
    A total of 3 intermediate wells will be installed to 70 ft bgs, the remaining 3 intermediate wells are to be installed to a depth of 100 ft bgs.
    A total of 3 deep wells will be installed to 200 ft bgs, the 3 remaining deep wells are to be installed to a depth of 250 ft bgs.

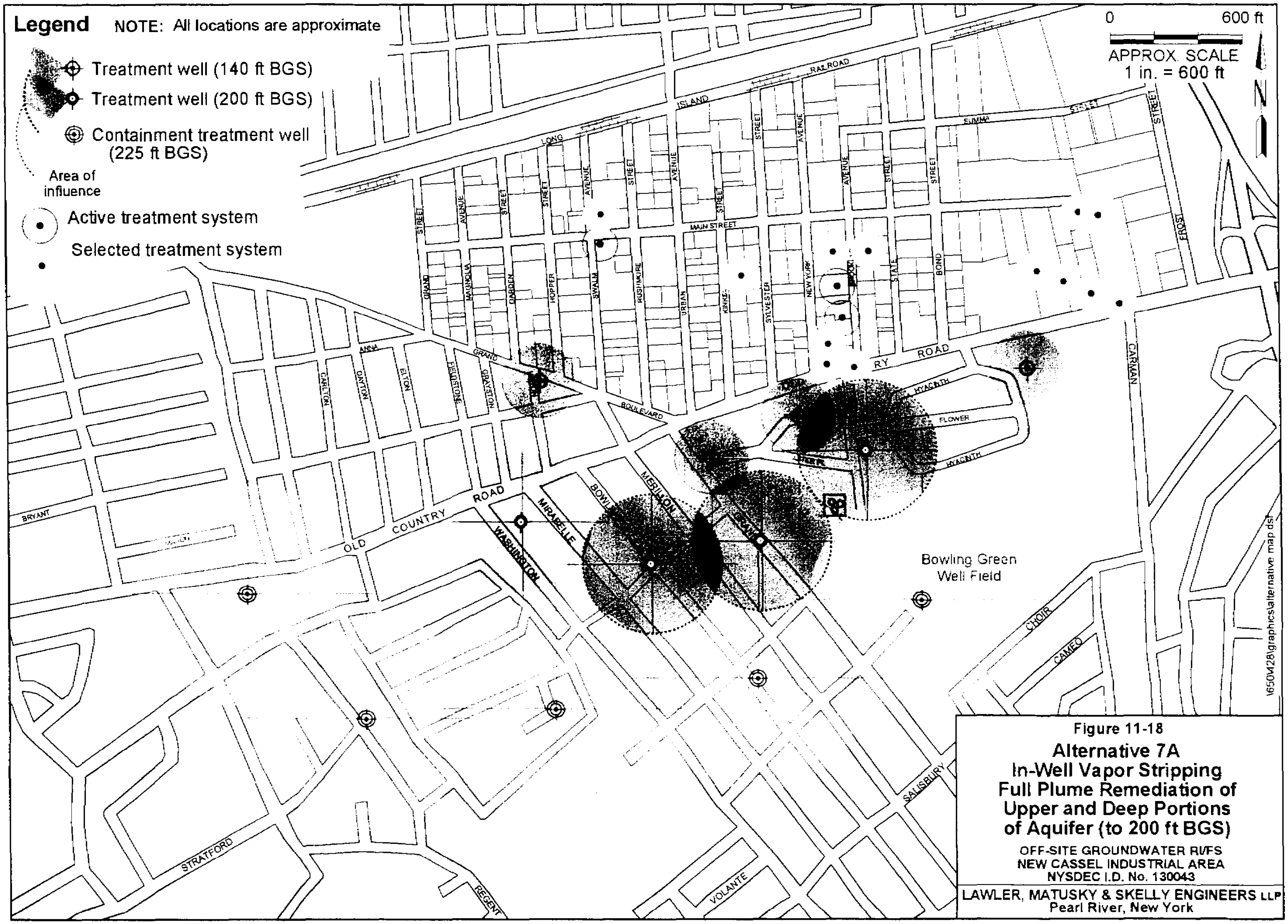

Figure 11-18

Alternative 7A
In-Well Vapor Stripping
Full Plume Remediation of Upper and Deep Portions of Aquifer (to 200 ft BGS)

OFF-SITE GROUNDWATER RI/FS
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

Treatment wells (installed to 140-ft, 200-ft, and 225-ft bgs) are employed under this alternative to achieve remedial objectives. Figure 11-19 shows average total VOC contaminant plumes (years 1996 – 2000) for depths of 65 – 200 ft bgs. Figure 11-20 displays treatment well locations and radii of influence and portions of the off-site plumes addressed in Alternative 7A.

Alternative 7A includes the treatment of the contaminated off-site groundwater via thirteen in-well vapor stripping wells. Alternative 7A includes the installation of four 140-ft stripper wells, four 200-ft stripper wells, and five 225-ft containment wells. Table 11-5 summarizes the system components and operation parameters for Alternative 7A. As for the other in-well vapor stripping scenarios presented in this FS, pilot studies and field measurements in the design phase of work will more accurately determine the construction details and placement of each of the in-well vapor stripping wells in Alternative 7A, along with the specific groundwater circulation/treatment patterns expected to result.

Based on the treatment technology and aquifer characteristics in the off-site area, the estimated groundwater flow rate in the 140-ft wells is 40 gpm, the flow rate in the 200-ft wells is 10 gpm, and the flow rate in each containment treatment well is 10 gpm. According to venders of the in-well vapor stripping technology, the following radii of influence can be achieved for each type of stripping well in Alternative 7A: 225-ft containment well: 510 ft; 140-ft well: 175 ft; and 200-ft well: 325 ft (refer to Figures 11-20).

Prior to the final design of Alternative 7A, pilot-scale treatability studies should be performed to determine the off-site groundwater remediation timeframe and specifications of the in-well vapor stripping system. A pilot scale test can also determine optimal system configurations and design parameters, such as number/location of wells, operating pressures, and flow rates to remove contaminants from the groundwater. The results of a pilot study can also be used to evaluate the airflow distribution and vapor phase treatment approaches. In addition, potential impacts from natural iron and pH in the subsurface can be better evaluated. The results of the pilot tests will also be used to better estimate the power requirements of the system. Any potential effects from in-well vapor stripping on the Bowling Green supply wells or other remediation systems (i.e., within the NCIA) can also be evaluated. For this FS, it was assumed that a total of three

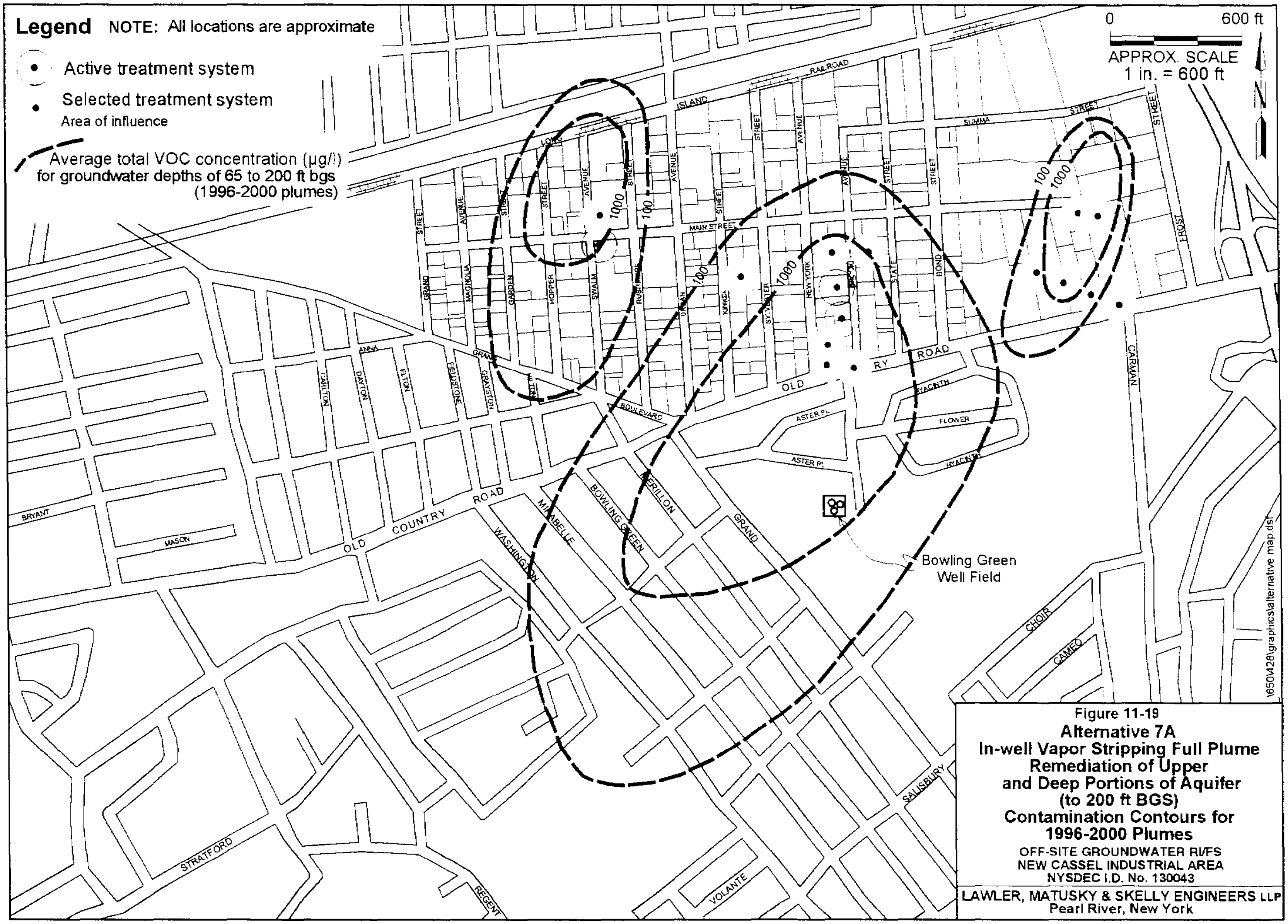

Figure 11-19
Alternative 7A
In-well Vapor Stripping Full Plume Remediation of Upper and Deep Portions of Aquifer (to 200 ft BGS)
Contamination Contours for 1996-2000 Plumes

OFF-SITE GROUNDWATER RI/FS
NEW CASSEL INDUSTRIAL AREA
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Figure 11-20
Alternative 7A
In-well Vapor Stripping Full Plume Remediation of Upper and Deep Portions of Aquifer (to 200 ft BGS) Treatment Well Placement and Contamination Contours for 1996-2000 Plumes
OFF-SITE GROUNDWATER RI/FS
NEW CASSEL INDUSTRIAL AREA
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in-well vapor stripping pilot tests (i.e., one per off-site contaminant plume) will be conducted under Alternative 7A. It was also assumed that a full-time system operator will be needed. For the Alternative 7A cost estimate, a project life of 7 years was assumed.

11.3.10.1 ***Vapor Phase Treatment.*** For Alternative 7A, vapors from the in-well vapor stripping processes will be collected from each stripping well and transferred with a vacuum extraction blower to a GAC treatment system within each local vault. The vapors containing VOCs are passed through the GAC medium, adsorbed, and then vented to the atmosphere. GAC was selected as the optimal vapor phase treatment option for Alternative 7A based on anticipated flow rates and contaminant concentrations.

In Alternative 7A, the vapor phase flow rates to the local GAC treatment systems differ for each type of stripper well. The vapor phase flow rates (scfm, assuming 75:1 air-to-water ratio) and initial carbon usage rates are summarized for Alternative 7A in Table 11-5. As for the other in-well vapor stripping alternatives, it was assumed that as VOC concentrations in the groundwater and vapor streams are reduced over time, the carbon usage rates will also decrease. When GAC is spent (i.e., saturated with VOCs), it is transported off-site for regeneration and replaced with fresh material.

High relative humidity of the treated vapor (i.e., above about 50%) reduces the adsorption efficiency of the GAC. Thus, vacuum extraction blowers in Alternative 7A should be specified so that sufficient heat is imparted to the vapor stream and the relative humidity is maintained within satisfactory limits.

A preliminary review of the VOC constituents and respective vapor phase concentrations anticipated at each well head for the Alternative 7A scenario indicates that an emission stack will not be required. However, the ultimate configurations of the localized vapor recovery/treatment systems, including GAC usage rates over time, should be based on the final design and results from the pilot study. Air monitoring and inspection of the vapor treatment systems after startup may also determine system requirements. For cost estimating purposes, GAC was the assumed vapor phase treatment option for the in-well vapor stripping Alternative 7A. However, other vapor phase treatment options (i.e., catalytic oxidation) may be evaluated during the final design and pilot study.

11.3.10.2 ***Waste Disposal.*** Minimal trenching is required for the Alternative 7A scenario, as control of the stripper wells and vapor phase treatment occur in subsurface vaults placed near each of the treatment wells. It is estimated that approximately 680 yd^3 of nonhazardous soil will require off-site disposal from the installation of the thirteen stripping wells and treatment vaults in Alternative 7A. All streets and areas disturbed by installation of the remediation system will be restored to original conditions.

Conservative estimates for condensate accumulation were made for Alternative 7A (refer to Table 11-5). Condensate will be periodically collected and disposed of at an approved off-site facility. Analytical sampling of the condensate and any other materials generated during remedial activities will be conducted to characterize the wastes and identify disposal options.

11.3.10.3 ***System Performance Monitoring.*** To confirm that the in-well vapor stripping system described above for Alternative 7A is achieving remedial objectives, periodic groundwater sampling will be conducted. For cost estimating purposes, it was assumed that groundwater samples will be collected from 16 existing monitoring wells in the off-site area and analyzed for VOCs. In addition, it is assumed that six new well couplets will be installed at intermediate and deep depths (i.e., same layout as described for long-term monitoring in Alternative 2). The results of these analyses will be used to determine whether remedial action objectives are being satisfied, and whether changes in system design, configuration, and operation are required. Table 11-14 itemizes the groundwater monitoring schedule for the Alternative 7A scenario.

The continued need for monitoring can be re-evaluated and possibly discontinued at any time during the project timeframes. For instance, if groundwater contaminant levels remain below the remedial action objectives for two or three consecutive sampling events, the monitoring program may be considered for discontinuation. If contaminant levels continue to exceed the remedial action objectives at the end project life, the monitoring program, and system operation, will be extended and/or other remedial actions may be taken.

Inspection of the GAC vapor treatment system and monitoring of any off-gas emissions will also occur as part of the overall system monitoring. It is assumed that samples of emissions will occur every two months for the first year of system operation, and

TABLE 11-14

ALTERNATIVE 7A
IN-WELL VAPOR STRIPPING
MONITORING PROGRAM SUMMARY [1]
NCIA Off-Site Groundwater

WELL[2]	Plume Location	DEPTH[3]	SAMPLING SCHEDULE[4] YEARS 1-2	SAMPLING SCHEDULE[5] YEARS 3-20
N-10477	West	57 ft (shallow)	X	X
N-10478	West	121 ft (intermediate)	X	X
N-11851	West	65 ft (shallow)	X	X
NRMW-4	West	70 ft (intermediate)	X	X
N-11848	West	60 ft (shallow)	X	X
N-11860	Central	60 ft (shallow)	X	X
N-11862	Central	60 ft (shallow)	X	X
N-10476	Central	130 ft (deep)	X	X
N-11861	Central	60 ft (shallow)	X	X
EW-1B	Central/East	164 ft (deep)	X	X
EW-1C	Central/East	516 ft (deep)	X	X
EW-2B	Central/East	142 ft (deep)	X	X
EW-2C	Central/East	514 ft (deep)	X	X
NRMW-1	Central/East	70 ft (intermediate)	X	X
N-9939	Central/East	74 ft (intermediate)	X	X
N-10329	East	57 ft (shallow)	X	X
6 proposed new well couplets[6]		**intermediate/deep**	X	X
		TOTAL:	**28**	**28**

X - Sampling is recommended.

1 - This is a preliminary monitoring program developed for cost estimation purposes; the final monitoring program will be established during the remedial design phase; depending on the sample results, the schedule may be modified.

2 - Well locations are depicted on Figures 3-4, 3-5, and 3-6 of the RI report.

3 - Shallow groundwater exists at depths between the water table and 64-ft; intermediate groundwater exists from approximately 65-124 ft bgs; deep groundwater exists at depths of 125 ft bgs or greater.

4 - All samples will be analyzed for VOCs quarterly.

5 - All samples will be analyzed for VOCs annually.

6 - For costing purposes, it is assumed that 6 new monitoring well locations will be established at locations downgradient and sidegradient of existing off-site plumes to monitor future VOC migration. It is assumed that monitoring wells will be installed at intermediate and deep depths as follows:
A total of 3 intermediate wells will be installed to 70 ft bgs; the remaining 3 intermediate wells are to be installed to a depth of 100 ft bgs.
A total of 3 deep wells will be installed to 200 ft bgs; the 3 remaining deep wells are to be installed to a depth of 250 ft bgs.

semiannually after that for the duration of the alternative timeframe. As with the groundwater monitoring, the continued need for air emissions monitoring will be re-evaluated during the course of the project, and may be reduced or considered for discontinuation after system start-up.

Alternative 7A also includes the operation and maintenance, including replacement of equipment as needed, of the VOC treatment processes that are currently in-place at the Bowling Green Water District (refer to Alternative 1).

11.3.11 Alternative 7B: Full Plume Remediation of Upper and Deep Portions of Aquifer (to 200 ft bgs) with Groundwater Extraction / Centralized Air Stripping and Vapor Treatment / Effluent Re-Injection

Alternative 7B is similar to Alternative 5B presented above (i.e., addresses contamination in the upper and deep portions of the aquifer with a pump and treat system) but includes the full-scale treatment of contaminated off-site groundwater to the designated depths to achieve Class GA groundwater criteria. As discussed above, active contaminant source removal and groundwater remediation is in-place or planned at 13 source sites within the NCIA. Figure 11-21 shows approximate locations of the extraction wells and the centralized treatment structure for Alternative 7B. On Figure 11-21, average total VOC plumes were derived from contaminant plume maps for groundwater at depths of 65 to 200 ft bgs. As shown, thirteen extraction wells (one 80-ft well and twelve 150-ft wells) are included under Alternative 7B. Details and construction of the extraction wells used in Alternative 7B are as described in the other pump and treat alternatives. The bottom 20 ft of each extraction well will be screened. It is assumed under Alternative 7B that the 150-ft extraction wells will remove groundwater contaminants from depths as great as 200 ft bgs. This assumption, and final extraction well details, should be confirmed during pilot studies and in the final design phase of work. The central structure (approximately 4000 sf) will likely be located to the east of the Bowling Green supply wells (same location as central treatment building described for other pump and treat alternatives). The structure size and location shall be confirmed in the final design.

Table 11-7 summarizes the system components for Alternative 7B. As for the other groundwater extraction/air stripping scenarios presented, aquifer pump tests and pilot studies (i.e., one per plume) in the design phase of work will more accurately determine

Figure 11-21

Alternative 7B
Groundwater Extraction/Air Stripping
Full Plume Remediation of
Aquifer to 200 ft bgs

OFF-SITE GROUNDWATER RI/FS
NEW CASSEL INDUSTRIAL AREA
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the construction details and placement of each of the extraction wells and recharge wet wells in Alternative 7B.

As shown in Table 11-7, the scenarios presented under Alternative 7B will utilize eight wet wells with approximate depths of 15 ft bgs for re-injection of treated groundwater to the subsurface. The wet wells will be located beside the central treatment building. Re-injection of treated water into the subsurface will require that all relevant discharge standards are achieved. In addition, local or state permits may be required. The treatability/pilot studies will help to evaluate the ability of the treatment processes to meet discharge requirements near the treatment building. Pilot studies can also help determine reinjection schedules and potential impacts of reinjection on the Bowling Green supply wells or other remediation systems (i.e., within the NCIA). If discharge limitations are not satisfied, polishing via carbon adsorption may be necessary. The treated effluent will be periodically monitored to ensure that discharge limits are met.

It is estimated that approximately 60 yd^3 of nonhazardous soil will require off-site disposal from the installation of the extraction wells in Alternative 7B. In addition, approximately 41,000 ft^2 of asphalt will also be excavated and require off-site disposal under Alternative 7B. All streets and areas disturbed by trenching and installation of the remediation system will be restored to original conditions. It is estimated that approximately 10,300 l.f. of trenching are required under Alternative 7B.

For Alternative 7B, it is assumed that a full-time operator will be needed to operate, supervise, and monitor the treatment system. Operation and maintenance items described for the other pump and treat alternatives (i.e., electricity; periodic repair and replacement of system parts/components; routine operator inspection of the system; and system monitoring) also apply to Alternative 7B. System inspection, maintenance, and monitoring activities consist of assessments of the remediation system, cleaning and maintaining the components, and collection of real-time air measurements, as required.

For cost estimating purposes in this FS, a project life of 10 years is assumed for Alternative 7B. Although overall flowrates and numbers of extraction wells are similar to the Alternative 6B scenario, a longer project life was assumed for Alternative 7B since greater quantities of contaminated groundwater are addressed. This estimated remediation time should be confirmed after an aquifer pump test establishes better values for the hydrological parameters.

11.3.11.1 ***System Performance Monitoring.*** The long-term monitoring program included in this alternative is intended to assess the effectiveness of groundwater extraction and treatment on the contaminant levels in the aquifer over time. Monitoring will consist of system performance monitoring and effluent quality monitoring. For Alternative 7B, during the first three months that the treatment plant is in operation, VOC samples will be collected from the equalization tank and the effluent pipe once per week to evaluate the efficiency and effectiveness of the treatment plant. The effluent sample analysis will be used to demonstrate that all discharge requirements are being met. For the remainder of the project lives of the alternatives, VOC sampling at each of the influent pipes and the single effluent pipe at the treatment plant will be collected once per month. Samples will be analyzed for conventional parameters (e.g., pH, solids, and alkalinity) as well as VOC content. As reference, Table 11-8 lists the effluent limitations (Class GA) for the VOCs of concern.

To confirm that the groundwater extraction/air stripping system described above for Alternative 7B is achieving remedial objectives, periodic groundwater sampling will be conducted. For cost estimating purposes, it was assumed that groundwater samples will be collected from 16 existing monitoring wells in the off-site area and analyzed for VOCs. In addition, it is assumed that six new well couplets will be installed at intermediate and deep depths (i.e., same layout as described for long-term monitoring in Alternative 2). The results of these analyses will be used to determine whether remedial action objectives are being satisfied, and whether changes in system design, configuration, and operation are required. Table 11-15 itemizes the groundwater monitoring schedule for the Alternative 7B scenario.

The continued need for groundwater monitoring can be re-evaluated and possibly discontinued at any time during the project timeframe. For instance, if groundwater contaminant levels remain below the site remedial action objectives for two or three consecutive sampling events, the monitoring program may be considered for discontinuation. If contaminant levels continue to exceed the remedial action objectives at the end of the project life, the monitoring program, and system operation, will be extended and/or other remedial actions may be taken.

TABLE 11-15

ALTERNATIVE 7B
GROUNDWATER EXTRACTION / AIRSTRIPPING
MONITORING PROGRAM SUMMARY [1]

NCIA Off-Site Groundwater

WELL[2]	Plume Location	DEPTH[3]	SAMPLING SCHEDULE[4] YEARS 1-2	SAMPLING SCHEDULE[5] YEARS 3-20
N-10477	West	57 ft (shallow)	X	X
N-10478	West	121 ft (intermediate)	X	X
N-11851	West	65 ft (shallow)	X	X
NRMW-4	West	70 ft (intermediate)	X	X
N-11848	West	60 ft (shallow)	X	X
N-11860	Central	60 ft (shallow)	X	X
N-11862	Central	60 ft (shallow)	X	X
N-10476	Central	130 ft (deep)	X	X
N-11861	Central	60 ft (shallow)	X	X
EW-1B	Central/East	164 ft (deep)	X	X
EW-1C	Central/East	516 ft (deep)	X	X
EW-2B	Central/East	142 ft (deep)	X	X
EW-2C	Central/East	514 ft (deep)	X	X
NRMW-1	Central/East	70 ft (intermediate)	X	X
N-9939	Central/East	74 ft (intermediate)	X	X
N-10329	East	57 ft (shallow)	X	X
6 proposed new well couplets[6]		**intermediate/deep**	X	X
		TOTAL:	**28**	**28**

X - Sampling is recommended.
1 - This is a preliminary monitoring program developed for cost estimation purposes; the final monitoring program will be established during the remedial design phase; depending on the sample results, the schedule may be modified.
2 - Well locations are depicted on Figures 3-4, 3-5, and 3-6 of the RI report.
3 - Shallow groundwater exists at depths between the water table and 64-ft, intermediate groundwater exists from approximately 65-124 ft bgs. deep groundwater exists at depths of 125 ft bgs or greater.
4 - All samples will be analyzed for VOCs quarterly.
5 - All samples will be analyzed for VOCs annually.
6 - For costing purposes, it is assumed that 6 new monitoring well locations will be established at locations downgradient and sidegradient of existing off-site plumes to monitor future VOC migration. It is assumed that monitoring wells will be installed at intermediate and deep depths as follows:
A total of 3 intermediate wells will be installed to 70 ft bgs; the remaining 3 intermediate wells are to be installed to a depth of 100 ft bgs.
A total of 3 deep wells will be installed to 200 ft bgs; the 3 remaining deep wells are to be installed to a depth of 250 ft bgs.

Inspection of the GAC vapor treatment system and monitoring of any off-gas emissions will also occur as part of the overall system monitoring. It is assumed that samples of emissions will occur every two months for the first year of system operation, and semiannually after that for the duration of the alternative timeframe. As with the groundwater monitoring, the continued need for air emissions monitoring will be re-evaluated during the course of the project, and may be reduced or considered for discontinuation after system start-up.

Alternative 7B also includes the operation and maintenance, including replacement of equipment as needed, of the VOC treatment processes that are currently in-place at the Bowling Green Water District (refer to Alternative 1).

CHAPTER 12

DETAILED EVALUATION OF GROUNDWATER RESPONSE ALTERNATIVES

12.1 INTRODUCTION

This chapter presents the detailed evaluation of the remedial alternatives described in Chapter 11. The purpose of the evaluation is to identify the advantages and disadvantages of each alternative as well as key tradeoffs among the alternatives. The following criteria are used to evaluate the remedial alternatives in accordance with the NYSDEC TAGM HWR-90-4030, "Selection of Remedial Actions at Inactive Hazardous Waste Sites".

- **Overall Protection of Human Health and the Environment:** This criterion evaluates the extent to which the alternative will achieve and maintain protection of human health and the environment and how the protection will be achieved, i.e., through treatment, engineering, or institutional controls.

- **Compliance with SCGs:** This criterion evaluates the compliance of the alternative with all identified chemical-, location-, and action-specific SCGs. Chemical-specific SCGs for the off-site groundwater COCs are listed in Chapter 7. Remedial alternatives were also developed for this FS in accordance with TAGM HWR-90-4030.

- **Reduction of Toxicity, Mobility, and Volume Through Treatment:** The NCP specifies that preference be given to alternatives that reduce the toxicity, mobility, or volume of contamination present through treatment. The degree to which each alternative results in a reduction is evaluated by this criterion.

- **Short-Term Effectiveness:** This criterion evaluates the impacts of each alternative on human health and the environment during the construction and implementation of the remedy.

- **Long-Term Effectiveness and Permanence:** Each alternative is evaluated for its long-term effectiveness in protecting human health and the environment following completion of the remedial action.

- **Implementability:** The technical and administrative feasibility of implementing each alternative, including site features that may restrict application of the alternative, are evaluated for this criterion.

- **Cost:** The relative capital costs have been estimated for each alternative. Operation and maintenance (O&M) costs range from an assumed 30 years for No Further Action, MNA, and Monitoring, Assessment, and Contingent Remediation to the projected times of a few years for the active remedies. The total present worth costs associated with the active remediation-based alternatives are evaluated over the anticipated system operating times (depending on the alternative) with additional years of concurrent groundwater monitoring. The cost estimates included in this FS are for comparative purposes; detailed cost estimates are prepared in the remedial design phase.

Community acceptance, the eighth criterion, is also to be considered in evaluating the remedial alternatives. Community acceptance cannot be assessed until public comments have been received on the RI/FS report and proposed remedial action plan. The ROD for the NCIA off-site groundwater will address public comments.

12.2 INDIVIDUAL ANALYSIS OF ALTERNATIVES

The individual analysis of the eleven groundwater response alternatives with respect to the evaluation criteria is presented below and is summarized in Table 12-1. The analysis of all clean-up scenarios under the active remediation alternatives (i.e., Alternatives 4A, 4B, 5A, 5B, 6A, 6B, 7A, and 7B) are also included in Table 12-1.

12.2.1 Alternative 1: No Further Action

12.2.1.1 ***Protection of Human Health and the Environment.*** Institutional measures included in Alternative 1 serve to protect human health by preventing human contact with the contaminants that will remain in the off-site groundwater. While the potential for human exposure to the contaminants in the groundwater will remain, treatment of groundwater (i.e., air stripping and GAC adsorption) by the Bowling Green Water District prior to distribution into the public water supply system prevents exposure to groundwater contaminants. However, the off-site contamination may continue to impact the surrounding environment through the migration of VOCs through the groundwater.

TABLE 12-1 (Page 1 of 3)

SUMMARY OF DETAILED EVALUATION OF REMEDIAL ALTERNATIVES
NCIA Off-Site Groundwater

ALTERNATIVE	OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT	COMPLIANCE WITH SCGs	REDUCTION OF TOXICITY, MOBILITY OR VOLUME	SHORT-TERM EFFECTIVENESS	LONG-TERM EFFECTIVENESS AND PERMANENCE	IMPLEMENTABILITY	COST	
ALTERNATIVE 1: No Further Action	Minimal prevention of human contact through institutional controls only Contaminants remain in the environment.	Will not quickly or actively achieve groundwater SCGs.	May allow natural processes to dissipate groundwater contaminants, but will not create any reduction in the toxicity, mobility, or volume of groundwater contaminants es no active remedial measures are included.	Does not result in disruption of normal residential/institutional activities or pose a short term threat to health or the environment.	Does not provide long-term effectiveness or permanence; contaminants will remain in the groundwater.	No major constraints to implementation of institutional measures.	Capital: O&M: Present Worth:	$0 $1,276,000 $1.5million
ALTERNATIVE 2: Monitored Natural Attenuation	Minimal prevention of human contact through institutional controls. Contaminants anticipated to remain in groundwater for several years.	Relies solely on natural attenuation to achieve site SCGs. Will not quickly achieve groundwater SCGs.	Relies on natural attenuation to reduce toxicity, mobility, and volume of contamination present in the groundwater. There is some evidence of natural attenuation occurring in off-site groundwater; however, it is not as effective as active remedies in reducing toxicity, mobility, and volume of VOCs.	Does not result in disruption of normal residential/institutional activities or pose a short term threat to health or the environment.	Contaminants expected to remain in off-site groundwater for long period of time.	No major constraints to implementation of institutional measures and monitoring.	Capital: O&M: Present Worth:	$304,000 $2,095,000 $2.4 million
ALTERNATIVE 3: Monitoring, Assessment, and Contingent Remediation	Minimal prevention of human contact through institutional controls only. Contaminants remain in the environment. However, a technical evaluation of data and remedial options that is to be made annually may lead to implementation of an active remedy (i.e., Alternative 5A).	Will not quickly or actively achieve groundwater SCGs. However, a technical evaluation of data and remedial options that is to be made on a yearly basis may lead to implementation of an active remedy.	May allow natural processes to dissipate groundwater contaminants, but will not create any reduction in the toxicity, mobility, or volume of groundwater contaminants as no active remedial measures are included. However, a technical evaluation of data and remedial options that is to be made on a yearly basis may lead to implementation of an active remedy.	Does not result in disruption of normal residential/institutional activities or pose a short term threat to health or the environment. However, an annual technical evaluation of data and remedial options mey lead to implementation of an active remedy.	Does not provide long-term effectiveness or permanence; contaminants will remain in the groundwater. However, an annual technical evaluation of data and remedial options may lead to implementation of an active remedy.	No major constraints to implementation of institutional measures and monitoring. However, the implementability of a remedial system (i.e., Alternative 5A) that may be installed in future years will be assessed.	Capital: O&M: Present Worth:	$162,000 $2,051,000 $2.2 million
ALTERNATIVE 4A: Remediation of Upper Portion of Aquifer (to 125 ft bgs) with In-Well Vapor Stripping/ Localized Vapor Delivery and Treatment	Protects human health and the environment by transferring contaminants from the water phase to the vapor phase and treating it ex-situ. Prevents further downgradient migration of groundwater contaminants that exist at 125 ft bgs and shallower, but addresses only "hot spot" areas. Not as protective as other in-well vapor stripping alternatives.	"Hot spot" remediation only. Natural attenuation anticipated to achieve groundwater standards over time. Only groundwater contamination in upper portion of aquifer is addressed. Air emissions will be controlled to meet SCGs.	Reduces the mobility and volume of VOCs in the off-site groundwater through in-situ treatment of the groundwater, but less reduction than in Alternative 5, 6, or 7.	Will result in disruption of normal residential/institutional activities during implementation of 4 treatment wells and local subsurface vaults. However, no extensive piping/trenching or large treetment building are required. Will generate some noise and traffic, but less than other in-well vapor stripping alternatives.	The operating time for this in-well vapor stripping system is estimated at 7 years. Technology permanently removes captured VOCs, but only "hot spot" areas in upper portion of aquifer are targeted. 13 years of natural attenuation assumed subsequent to active treatment to achieve remedial objectives.	Equipment for in-well vapor stripping technology is sold by a limited number of vendors. Equipment installation is readily implementable and available, depending on site logistics. Treatment wells and vaults can be located in streets (little or no land acquisition required).	Capital: O&M: Present Worth:	$838,000 $1,981,000 $2.8 million

R2-0000634

TABLE 12-1 (Page 2 of 3)

SUMMMARY OF DETAILED EVALUATION OF REMEDIAL ALTERNATIVES
NCIA Off-Site Groundwater

ALTERNATIVE	OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT	COMPLIANCE WITH SCGs	REDUCTION OF TOXICITY, MOBILITY OR VOLUME	SHORT-TERM EFFECTIVENESS	LONG-TERM EFFECTIVENESS AND PERMANENCE	IMPLEMENTABILITY	COST	
ALTERNATIVE 4B: Remediation of Upper Portion of Aquifer (to 125 ft bgs) with Groundwater Extraction/ Centralized Air Stripping and Vapor Treatment/ Effluent Re-Injection	Protects human health and the environment by extracting contaminated groundwater from the aquifer and treating it ex-situ. Prevents further downgradient migration of groundwater contaminants that exist at 125 ft bgs and shallower, but addresses only "hot spot" areas. Not as protective as other pump and treat alternatives.	"Hot spot" remediation only. Natural attenuation anticipated to achieve groundwater standards over time. Only groundwater contamination in upper portion of aquifer is addressed. Air emissions and treated effluent discharge will be controlled to meet SCGs.	Reduces volume and mobility of contaminants in groundwater through extraction; VOCs in extracted groundwater reduced by treatment. Less reduction than in Alternative 5, 6, or 7.	Will result in disruption of normal residential/institutional activities during implementation of 4 extraction wells, piping, and an approximately 3200 s.f. central treatment building. Less piping/trenching than other pump and treat alternatives. Will generate some noise and traffic.	The estimated operating time for this pump and treat system is 9 years. Technology permanently removes captured VOCs, but only "hot spot" areas in upper portion of aquifer are targeted. 11 years of natural attenuation assumed subsequent to active treatment to achieve remedial objectives.	Well and piping installation and treatment facility construction can be readily implemented, depending on site logistics. Treated water must be re-injected to subsurface. Land will likely need to be acquired for central treatment building and wet wells for groundwater re-injection.	Capital: O&M: Present Worth:	$2,328,000 $2,624,000 $5.0 million
ALTERNATIVE 5A: Remediation of Upper and Deep Portions of Aquifer (to 200ft bgs) with In-Well Vapor Stripping/ Localized Vapor Delivery and Treatment	Protects human health and the environment by transferring contaminants from the water phase to the vapor phase and treating it ex-situ. Prevents further downgradient migration of contaminants, but addresses only "hot spot" areas. More protective than Alternative 4A, as both upper and deep portions of aquifer are addressed.	"Hot spot" remediation only. Natural attenuation anticipated to achieve groundwater standards over time. Air emissions will be controlled to meet SCGs.	Reduces the mobility and volume of VOCs in the off-site groundwater through in-situ treatment of the groundwater, but less reduction than in Alternative 6 or 7.	Will result in disruption of normal residential/institutional activities during implementation of 6 treatment wells and local subsurface vaults. However, no extensive piping/trenching or large treatment building are required. Will generate some noise and traffic, but less than Alternatives 6A and 7A.	The operating time for this in-well vapor stripping system is estimated at 9 years. Technology permanently removes captured VOCs, but only "hot spot" areas in upper and deep portions of aquifer are targeted. 11 years of natural attenuation assumed subsequent to active treatment to achieve remedial objectives.	Equipment for in-well vapor stripping technology is sold by a limited number of vendors. Equipment installation is readily implementable and available, depending on site logistics. Treatment wells and vaults can be located in streets (little or no land acquisition required).	Capital: O&M: Present Worth:	$1,164,000 $2,392,000 $3.6 million
ALTERNATIVE 5B: Remediation of Upper and Deep Portions of Aquifer (to 200 ft bgs) with Groundwater Extraction/ Centralized Air Stripping and Vapor Treatment/ Effluent Re-Injection	Protects human health and the environment by extracting contaminated groundwater from the aquifer and treating it ex-situ. Prevents further downgradient migration of contaminants, but addresses only "hot spot" areas. More protective than Alternative 4B, as both upper and deep portions of aquifer are addressed.	"Hot spot" remediation only. Natural attenuation anticipated to achieve groundwater standards over time. Air emissions and treated effluent discharge will be controlled to meet SCGs.	Reduces volume and mobility of contaminants in groundwater through extraction; VOCs in extracted groundwater reduced by treatment. Less reduction than in Alternative 6 or 7.	Will result in disruption of normal residential/institutional activities during implementation of 4 extraction wells, piping, and an approximately 3200 s.f. central treatment building. Less piping/trenching than other pump and treat alternatives. Will generate some noise and traffic.	The estimated operating time for this pump and treat system is 12 years. Technology permanently removes captured VOCs, but only "hot spot" areas in upper and deep portions of aquifer are targeted. 8 years of natural attenuation assumed subsequent to active treatment to achieve remedial objectives.	Well and piping installation and treatment facility construction can be readily implemented, depending on site logistics. Treated water must be re-injected to subsurface. Land will likely need to be acquired for central treatment building and wet wells for groundwater re-injection.	Capital: O&M: Present Worth:	$2,401,000 $2,899,000 $5.3 million
ALTERNATIVE 6A: Full Plume Remediation of Upper Portion of Aquifer (to 125ft bgs) with In-Well Vapor Stripping/ Localized Vapor Delivery and Treatment	Protects human health and the environment by transferring contaminants from the water phase to the vapor phase and treating it ex-situ. Prevents further downgradient migration of contaminants that exist at 125 ft bgs and shallower. Class GA groundwater standards are achieved at designated depths. Thus, more protective than Alternative 4A.	Achieves applicable groundwater standards. However, only contamination in upper portion of aquifer is addressed. Air emissions will be controlled to meet SCGs.	Reduces the mobility and volume of VOCs in the off-site groundwater through in-situ treatment of the groundwater.	Will result in disruption of normal residential/institutional activities during implementation of 9 treatment wells and local subsurface vaults. However, no extensive piping/trenching or large treatment building are required. Will generate some noise and traffic.	The operating time for this in-well vapor stripping system is estimated at 5 years. Technology permanently removes captured VOCs.	Equipment for in-well vapor stripping technology is sold by a limited number of vendors. Equipment installation is readily implementable and available, depending on site logistics. Treatment wells and vaults can be located in streets (little or no land acquisition required).	Capital: O&M: Present Worth:	$1,434,000 $2,238,000 $3.7 million

SUMMMARY OF DETAILED EVALUATION OF REMEDIAL ALTERNATIVES
NCIA Off-Site Groundwater

ALTERNATIVE	OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT	COMPLIANCE WITH SCGs	REDUCTION OF TOXICITY, MOBILITY OR VOLUME	SHORT-TERM EFFECTIVENESS	LONG-TERM EFFECTIVENESS AND PERMANENCE	IMPLEMENTABILITY	COST	
ALTERNATIVE 6B: Full Plume Remediation of Upper Portion of Aquifer (to 125 ft bgs) with Groundwater Extraction/ Centralized Air Stripping and Vapor Treatment/ Effluent Re-Injection	Protects human health and the environment by extracting contaminated groundwater from the aquifer and treating it ex-situ. Prevents further down-gradient migration of contaminants that exist at 125 ft bgs and shallower. Class GA groundwater standards are achieved at designated depths. Thus, more protective than Alternative 4B.	Achieves applicable groundwater standards. However, only contamination in upper portion of aquifer is addressed. Air emissions and treated effluent discharge will be controlled to meet SCGs.	Reduces volume and mobility of contaminants in groundwater through extraction; VOCs in extracted groundwater reduced by treatment.	Will result in disruption of normal residential/institutional activities during implementation of 12 extraction wells, piping, and an approximately 4000 s.f. central treatment building. Will generate some noise and traffic.	The estimated operating time for this pump and treat system is 7 years. Technology permanently removes captured VOCs.	Well and piping installation and treatment facility construction can be readily implemented, depending on site logistics. Treated water must be re-injected to subsurface. Land will likely need to be acqured for central treatment building and wet wells for groundwater re-injection.	Capital: O&M: Present Worth:	$3,848,000 $3,241,000 $7.1 million
ALTERNATIVE 7A: Full Plume Remediation of Upper and Deep Portions of Aquifer (to 200ft bgs) with In-Well Vapor Stripping/ Localized Vapor Delivery and Treatment	Protects human health and the environment by transferring contaminants from the water phase to the vapor phase and treating it ex-situ. Prevents further downgradient migration of contaminants. Class GA groundwater standards are achieved at designated depths. Both upper and deep portions of aquifer are addressed. Most protective in-well vapor stripping alternative	Achieves applicable groundwater standards. Air emissions will be controlled to meet SCGs.	Reduces the mobility and volume of VOCs in the off-site groundwater through in-situ treatment of the groundwater. Most reduction of all in-well vapor stripping alternatives.	Will result in disruption of normal residential/institutional activities during implementation of 13 treatment wells and local subsurface vaults. However, no extensive piping/trenching or large treatment building are required. Will generate some noise and traffic.	The operating time for this in-well vapor stripping system is estimated at 7 years. Technology permanently removes captured VOCs.	Equipment for in-well vapor stripping technology is sold by a limited number of vendors. Equipment installation is readily implementable and available, depending on site logistics. Treatment wells and vaults can be located in streets (little or no land acquisition required).	Capital: O&M: Present Worth:	$2,108,000 $2,833,000 $4.9 million
ALTERNATIVE 7B: Full Plume Remediation of Upper and Deep Portions of Aquifer (to 200 ft bgs) with Groundwater Extraction/ Centralized Air Stripping and Vapor Treatment/ Effluent Re-Injection	Protects human health and the environment by extracting contaminated groundwater from the aquifer and treating it ex-situ. Prevents further down-gradient migration of contaminants. Class GA groundwater standards are achieved at designated depths. Both upper and deep portions of aquifer are addressed. Most protective pump and treat alternative.	Achieves applicable groundwater standards. Air emissions and treated effluent discharge will be controlled to meet SCGs.	Reduces volume and mobility of contaminants in groundwater through extraction; VOCs in extracted groundwater reduced by treatment. Most reduction of all pump and treat alternatives.	Will result in disruption of normal residential/institutional activities during implementation of 13 extraction wells, piping, and an approximately 4000 s.f. central treatment building. Will generate some noise and traffic.	The estimated operating time for this pump and treat system is 10 years. Technology permanently removes captured VOCs.	Well and piping installation and treatment facility construction can be readily implemented, depending on site logistics. Treated water must be re-injected to subsurface. Land will likely need to be acquired for central treatment building and wet wells for groundwater re-injection.	Capital: O&M: Present Worth:	$4,251,000 $3,935,000 $8.2 million

12.2.1.2 ***Compliance With SCGs.*** Since this alternative does not include an active remedial measure, it is highly unlikely that NYSDEC Class GA groundwater standards will be achieved in a short time frame.

Because this alternative does not include any active remedial measures, no air releases are expected; therefore no National Ambient Air Quality Standards (NAAQS) apply. As no active remedy is proposed under Alternative 1, location-specific SCGs do not apply. As Alternative 1 does not include any active remediation activities, there are no action-specific TBCs that apply to this alternative.

Alternative 1 does not comply with the Federal or state requirements which state that the selected remedial alternative must attain a cleanup level that eliminates, reduces, or controls risks to human health and the environment.

12.2.1.3 ***Reduction of Toxicity, Mobility, and Volume Through Treatment.*** Alternative 1 will not result in a substantial reduction in the toxicity, mobility, or volume of the contaminated groundwater.

12.2.1.4 ***Short-Term Effectiveness.*** Alternative 1 will not result in short-term human or environmental impacts as no activities will occur.

12.2.1.5 ***Long-Term Effectiveness and Permanence.*** Alternative 1 does not provide a high degree of long-term effectiveness and permanence, hence environmental degradation may continue to occur due to the migration of contaminants. Although human health risks may be mitigated through the use of development and groundwater use restrictions, these institutional measures may not eliminate the potential for human exposure to groundwater contaminants in downgradient areas.

12.2.1.6 ***Implementability.*** Implementation of this alternative is straightforward and should not depend on the availability of vendors, materials, or services. Development and groundwater use restrictions would be implemented by NYSDEC or the municipality.

12.2.1.7 ***Cost.*** Capital costs included in Alternative 1 are related to legal and administrative costs associated with implementing institutional measures (the costs of which would be determined in the future depending on how the institutional measures are implemented). Estimated long-term O&M costs, including the operation and maintenance of the Bowling Green VOC treatment processes, are included in Table 12-2. These costs are based on the assumptions included in the description of the alternative provided in Chapter 11 and have a range of accuracy of -30 to +50%. Annual O&M costs are estimated on a 30-year implementation basis and based on a 5% discount rate (EPA 1988) to estimate the present worth cost.

12.2.2 **Alternative 2: Monitored Natural Attenuation**

12.2.2.1 ***Protection of Human Health and the Environment.*** Institutional measures included in Alternative 2 serve to protect human health by preventing human contact with the contaminants that will remain in the off-site groundwater. While the potential for human exposure to the contaminants will remain, treatment of groundwater (i.e., air stripping and GAC adsorption) by the Bowling Green Water District prior to distribution into the public water supply system prevents exposure to groundwater contaminants. However, the contamination may continue to impact the surrounding environment through the migration of VOCs in groundwater. MNA monitoring and long-term groundwater monitoring, as included in this alternative, are not protective of human health and the environment, but will assess any migration or natural attenuation of the contaminant plumes over time to document the nature of any continued risk posed by the contamination.

12.2.2.2 ***Compliance With SCGs.*** Since this alternative relies solely on natural attenuation processes to remediate groundwater, it is highly unlikely that NYSDEC Class GA groundwater standards will be achieved in a short time frame.

Because this alternative does not include any active remedial measures, no air releases are expected; therefore no NAAQS apply. As no active remedy is proposed under Alternative 2, location-specific SCGs do not apply. As Alternative 2 does not include any active remediation activities, there are no action-specific SCGs that apply to this alternative. As no on-site remedial activities are included as part of this alternative, requirements of other TBCs do not apply to this alternative either.

Alternative 2 partially complies with the Federal or state requirements which state that the selected remedial alternative must attain a cleanup level that eliminates, reduces, or controls risks to human health and the environment. Under this alternative, off-site groundwater contaminants will be naturally attenuated in-situ.

TABLE 12-2

COST ESTIMATE FOR ALTERNATIVE 1: NO FURTHER ACTION

NCIA Off-Site Groundwater

ITEM	UNIT COST ($)[a]	QUANTITY	COST (2000 $)[b]	Present Worth Cost
CAPITAL COSTS				
A. Direct Costs				
Institutional Measures				
Development restrictions			- c	
Groudwater use restrictions			- c	
		Subtotal	$0	
B. Indirect Costs				
		Total	$0	
O&M COSTS				
Operation and maintenance of Bowling Green VOC treatment processes (years 1-30)				
Replacement of air stripping tower after year 20	$200,000 /rplmt	1 rplmt	$200,000	**$200,000**
GAC vessel O&M	$2,300 /month	12 months	$27,600 /yr	
includes vessel replacement every 10 yrs and GAC change-out				
Air Stripper O&M	$1,000 /month	12 months	$12,000 /yr	
Control/Electrical system O&M	$3,500 /yr	1 years	$3,500 /yr	
Electricity	$2,300 /month	12 months	$27,600 /yr	
Administrative costs	$1,000 /month	12 months	$12,000 /yr	
		Annual O&M cost for year 2000:	$83,000 /yr	**$1,276,000**
PRESENT WORTH				
Based on a 30-yr life and a 5% discount rate				***$1,476,000***
				SAY $ 1.5 million

a - Unit costs are for year 2000.
b - Costs rounded to the nearest $1,000.
c - Legal and administrative costs to community that are not included in cost estimate.
LS - Lump sum.

12.2.2.3 ***Reduction of Toxicity, Mobility, and Volume Through Treatment.*** Alternative 2 may result in a reduction in the toxicity, mobility, or volume of contamination present by means of in-situ natural attenuation processes. However, transformation products that are more toxic and mobile than parent compounds may possibly result. As noted in Chapter 11, there is limited to adequate evidence that natural attenuation will degrade the off-site groundwater contamination. This is based on the natural attenuation screening protocol produced from the BioChlor software. As shown in Figure 12-1, a score of 13 ("limited evidence for anaerobic biodegradation of chlorinated organics") was produced from the sum of several natural attenuation parameters. Since no data were obtained for three of the evaluation parameters (sulfide, carbon dioxide, and hydrogen), values of zero were assigned. Thus, it is possible that the natural attenuation score may actually be greater than 13 and possibly in the range of "adequate evidence for anaerobic biodegradation of chlorinated organics".

12.2.2.4 ***Short-Term Effectiveness.*** Alternative 2 will result in minimal short-term human or environmental impacts as the only active remedial activities that will occur at the off-site area include the installation of monitoring wells and sampling of existing and new wells. As sampling has already been accomplished without causing negative short-term effects, sampling conducted in the future is not expected to have adverse impacts.

12.2.2.5 ***Long-Term Effectiveness and Permanence.*** Alternative 2 is intended to reduce VOC concentrations in the off-site groundwater through natural attenuation processes. The estimated time frame for the MNA alternative is 30 years; however, the actual time frame may be longer or shorter. Appendix J includes attenuation projections from the BioChlor software for the off-site groundwater COCs. Periodic monitoring of natural attenuation processes for the off-site groundwater will be performed. An enhanced site characterization program (i.e., pilot) may lead to better estimates of the time frame for this alternative. Although human health risks may be minimized during the estimated 30-year alternative duration through the use of development and groundwater restrictions, these institutional measures may not eliminate the potential for human exposure to contaminants (e.g., groundwater uptake in downgradient areas). However, continued treatment of the groundwater supply for potable purposes (as is currently done) will minimize the potential for human exposure to the NCIA off-site groundwater contaminants.

12.2.2.6 ***Implementability.*** Implementation of this alternative is straightforward and should not depend on the availability of vendors, materials, or services. Development and

Figure 12-1

Natural Attenuation Screening Protocol	Interpretation	Score	
The following is taken from the USEPA protocol (USEPA 1998). The results of this scoring process have no regulatory significance.	Inadequate evidence for anaerobic biodegradation* of chlorinated organics	0 to 5	Score: 13
	Limited evidence for anaerobic biodegradation* of chlorinated organics	6 to 14	
	Adequate evidence for anaerobic biodegradation* of chlorinated organics	15 to 20	
	Strong evidence for anaerobic biodegradation* of chlorinated organics	>20	*Scroll to End of Table*

* reductive dechlorination

(0-7)±

Analysis	Concentration in Most Contam. Zone	Interpretation	Yes	No	Points Awarded	
Oxygen*	<0.5 mg/L	Tolerated, suppresses the reductive pathway at higher concentrations	○	●	0	
	>5mg/L	Not tolerated; however, VC may be oxidized aerobically	●	○	-3	
Nitrate*	<1 mg/L	At higher concentrations may compete with reductive pathway	○	●	0	
Iron II*	>1 mg/L	Reductive pathway possible; VC may be oxidized under Fe(III)-reducing conditions	●	○	3	
Sulfate*	<20 mg/L	At higher concentrations may compete with reductive pathway	○	●	0	
Sulfide*	>1 mg/L	Reductive pathway possible	○	○	0	(0 3)
Methane*	<0.5 mg/L	VC oxidizes	●	○	0	
	>0.5 mg/L	Ultimate reductive daughter product, VC Accumulates	○	●	0	
Oxidation Reduction Potential* (ORP)	<50 millivolts (mV)	Reductive pathway possible	○	●	0	
	<-100mV	Reductive pathway likely	○	●	0	
pH*	5 < pH < 9	Optimal range for reductive pathway	●	○	0	
	5 > pH >9	Outside optimal range for reductive pathway	○	●	0	
TOC	>20 mg/L	Carbon and energy source; drives dechlorination, can be natural or anthropogenic	●	○	2	
Temperature*	>20°C	At T >20°C biochemical process is accelerated	○	●	0	
Carbon Dioxide	>2x background	Ultimate oxidative daughter product	○	○	0	(0-1)
Alkalinity	>2x background	Results from interaction of carbon dioxide with aquifer minerals	○	●	0	
Chloride*	>2x background	Daughter product of organic chlorine	○	●	0	
Hydrogen	>1 nM	Reductive pathway possible, VC may accumulate	○	○	0	(0 3)
	<1 nM	VC oxidized	○	○	0	
Volatile Fatty Acids	>0.1 mg/L	Intermediates resulting from biodegradation of aromatic compounds; carbon and energy source	○	●	0	
BTEX*	>0.1 mg/L	Carbon and energy source; drives dechlorination	○	●	0	
PCE*		Material released	●	○	0	
TCE*		Material released	●	○	0	
		Daughter product of PCE a/	●	○	2	
DCE*		Material released	○	●	0	
		Daughter product of TCE. If cis is greater than 80% of total DCE it is likely a daughter product of TCE a/; 1,1-DCE can be a chem. reaction product of TCA	●	○	2	
VC*		Material released	○	●	0	
		Daughter product of DCE a/	●	○	2	
1,1,1-Trichloroethane*		Material released	●	○	0	
DCA		Daughter product of TCA under reducing conditions	●	○	2	
Carbon Tetrachloride		Material released	○	●	0	
Chloroethane*		Daughter product of DCA or VC under reducing conditions	●	○	0	
Ethene/Ethane	>0.01 mg/L	Daughter product of VC/ethene	○	●	0	
	>0.1 mg/L	Daughter product of VC/ethene	○	●	3	
Chloroform		Material released	○	●	0	
		Daughter product of Carbon Tetrachloride	●	○	0	
Dichloromethane		Material released	○	●	0	
		Daughter product of Chloroform	○	●	0	

* required analyses

a/ Points awarded only if it can be shown that the compound is a daughter product (i.e., not a constituent of the source NAPL)

SCORE Reset

groundwater use restrictions would be implemented by NYSDEC or the municipality. Long-term groundwater monitoring and sampling are also readily accomplished.

12.2.2.7 ***Cost.*** Estimated capital and long-term O&M costs for Alternative 2 are included in Table 12-3. The long-term costs include the operation and maintenance of the Bowling Green VOC treatment processes. These costs are based on the assumptions included in the description of the alternative provided in Chapter 11 and have a range of accuracy of -30 to +50%. Annual O&M costs are estimated on a 30-year implementation basis, and are based on a 5% discount rate (EPA 1988) to estimate the present worth cost. Capital costs include monitoring well installation, along with legal and administrative costs associated with implementing institutional measures (the costs of which would be determined in the future depending on the way the institutional measures are implemented).

12.2.3 Alternative 3: Monitoring, Assessment, and Contingent Remediation

12.2.3.1 ***Protection of Human Health and the Environment.*** Institutional measures included in Alternative 3 serve to protect human health by preventing human contact with the contaminants that will remain in the off-site groundwater. While the potential for human exposure to the contaminants in the groundwater will remain, treatment of groundwater (i.e., air stripping and GAC adsorption) by the Bowling Green Water District prior to distribution into the public water supply system prevents exposure to groundwater contaminants. However, the off-site contamination may continue to impact the surrounding environment through the migration of VOCs through the groundwater. Long-term groundwater monitoring, as included in this alternative, is not protective of human health and the environment, but will assess any migration of the contaminant plume over time to document the nature of any continued risk posed by the contamination.

12.2.3.2 ***Compliance With SCGs.*** Since this alternative does not include an active remedial measure, it is highly unlikely that NYSDEC Class GA groundwater standards will be achieved in a short time frame. However, a technical evaluation of off-site groundwater monitoring data and remedial options will be performed annually. Based on the findings from the evaluation of the groundwater data, the monitoring program will be continued, discontinued, or amended as to number of wells and frequencies of monitoring. Based on the findings from the remedial options assessment, decisions will also be made as to the implementation of active groundwater remediation (i.e., Alternative 5A).

TABLE 12-3 (Page 1 of 2)

COST ESTIMATE FOR ALTERNATIVE 2: MONITORED NATURAL ATTENUATION

NCIA Off-Site Groundwater

ITEM	UNIT COST ($)[a]		QUANTITY	COST (2000 $)[b]	Present Worth Cost
CAPITAL COSTS					
A. Direct Costs					
Site Characterization					
Pilot Study includes MNA site conceptual model development, and additional characterization sampling	LS			$25,000	
Aquifer Pump Test (including treatment)	LS			$70,000	
Installation of Monitoring Well Couplets					
Intermediate/deep well couplets (70 and 200 ft bgs)	$15,000	/couplet	3 couplets	$45,000	
Intermediate/deep well couplets (100 and 250 ft bgs)	$21,000	/couplet	3 couplets	$63,000	
Institutional Measures					
Development restrictions				-[c]	
Groundwater use restrictions				-[c]	
			Subtotal	$203,000	
B. Indirect Costs					
Engineering and Design @ 15%				$30,000	
Legal and Administrative @ 10%				$20,000	
Contingency @ 25%				$51,000	
			Total	$304,000	**$304,000**

TABLE 12-3 (Page 2 of 2)

COST ESTIMATE FOR ALTERNATIVE 2: MONITORED NATURAL ATTENUATION

NCIA Off-Site Groundwater

ITEM	UNIT COST ($)[a]	QUANTITY	COST (2000 $)[b]	PRESENT WORTH COST
O&M COSTS				
Years 1-5				
Natural Attenuation Monitoring				
Quarterly sampling of 14 wells	$450 /well			
includes data and model evaluation		Annual Cost year 1 (56 wells):	$25,000 /yr	
Contaminant Plume Monitoring	$500 /well			
Semiannual sampling of 28 wells for VOCs		Annual Cost year 1 (56 wells):	$28,000 /yr	
			$53,000 /yr	**$229,000**
Years 6-30				
Natural Attenuation Monitroing				
Annual sampling of 14 wells	$450 /well			
includes data and model evaluation		Annual Cost year 6 (14 wells):	$6,000 /yr	
Contaminant Plume Monitoring	$500 /well			
Annual sampling of 28 wells for VOCs		Annual Cost year 6 (28 wells):	$14,000 /yr	
			$20,000 /yr	**$221,000**
Replacement of 3 wells every five years[d]	$18,000 /well			
(years 1 - 30)		Annual Cost year 1:	$11,000 /yr	**$169,000**
Operation and maintenance of Bowling Green VOC treatment processes[e]				
		Annual O&M Cost for year 2000:	$83,000 /yr	
		Replacement of air stripping tower after year 20:	$200,000	
				$1,476,000
PRESENT WORTH				
Based on 30-year alternative time frame and a 5% discount rate.				***$2,399,000***
				SAY $2.4 Million

a - Unit costs are for year 2000.
b - Costs rounded to the nearest $1000.
c - Legal and administrative costs to community that are not included in this cost estimate.
d - Cost assumes replacement of wells no greater than 250 ft in depth. It is assumed that the deep EW well will not be replaced under the MNA program described in this FS.
e - Refer to Alternative 1 (Table 12-2) for itemized Bowling Green O&M costs.
LS - Lump sum.

12.2.3.3 ***Reduction of Toxicity, Mobility, and Volume Through Treatment.*** Alternative 3 will not result in a substantial reduction in the toxicity, mobility, or volume of the contaminated groundwater. The groundwater monitoring program will, however, identify any reduction in contaminant concentrations that may occur, and may be used in decisions to implement an active remedy.

12.2.3.4 ***Short-Term Effectiveness.*** Alternative 3 will result in minimal short-term human or environmental impacts as the only activities that will occur include monitoring well installation and sampling of existing and new wells. As sampling has already been accomplished at the off-site area without causing negative short-term effects, sampling conducted in the future is not expected to have adverse impacts.

12.2.3.5 ***Long-Term Effectiveness and Permanence.*** Alternative 3 does not provide a high degree of long-term effectiveness and permanence, hence environmental degradation may continue to occur due to the migration of contaminants. Although human health risks may be mitigated through the use of development and groundwater use restrictions, these institutional measures may not eliminate the potential for human exposure to groundwater contaminants in downgradient areas. However, continued treatment of the groundwater supply for potable purposes (as is currently done) will minimize the potential for human exposure to NCIA off-site groundwater contaminants.

12.2.3.6 ***Implementability.*** Implementation of this alternative is straightforward and should not depend on the availability of vendors, materials, or services. Development and groundwater use restrictions would be implemented by NYSDEC or the municipality. Long-term groundwater monitoring and sampling are also readily accomplished.

12.2.3.7 ***Cost.*** For Alternative 3, capital costs include the installation of new monitoring wells, an annual technical analysis of groundwater data and remedial options (considered over the first five years of the alternative), and legal and administrative costs associated with implementing institutional measures (the costs of which would be determined in the future depending on how the institutional measures are implemented). Estimated long-term O&M costs, including the operation and maintenance of the Bowling Green VOC treatment processes, are included in Table 12-4. These costs are based on the assumptions included in the description of the alternative provided in Chapter 11 and have a range of accuracy of -30 to +50%. Annual O&M costs are estimated on a 30-year implementation basis and based on a 5% discount rate (EPA 1988) to estimate the present worth cost.

TABLE 12-4

COST ESTIMATE FOR ALTERNATIVE 3: MONITORING, ASSESSMENT, AND CONTINGENT REMEDIATION

NCIA Off-Site Groundwater

ITEM	UNIT COST ($)[a]	QUANTITY	COST (2000 $)[b]	Present Worth cost
CAPITAL COSTS				
A. Direct Costs				
Institutional Measures				
Development restrictions			-[c]	
Groundwater use restrictions			-[c]	
Installation of Monitoring Wells				
Intermediate/deep well couplets (70 and 200 ft bgs)	$15,000 /couplet	3 couplets	$45,000	
Intermediate/deep well couplets (100 and 250 ft bgs)	$21,000 /couplet	3 couplets	$63,000	
		Subtotal	$108,000	
B. Indirect Costs				
Engineering and Design (15%)			$16,000	
Legal and Administrative (10%)			$11,000	
Contingency (25%)			$27,000	
		Total	**$162,000**	**$162,000**
O&M COSTS				
Long-term groundwater monitoring program				
Semiannual sampling of 28 wells for VOCs for first 5 years	$500 /well	Annual Cost for year 1 (56 wells):	$28,000 /yr	
Periodic data maintenance and technical review of monitoring data and remedial options (years 1 - 5)	$30,000 /year	Annual Cost for year 1:	$30,000 /yr	**$251,000**
Annual sampling of 28 wells for VOCs for years 6 through 30	$500 /well	Annual Cost for year 6 (28 wells):	$14,000 /yr	**$155,000**
Replacement of 3 wells every 5 years (years 1-30)	$18,000 /well	Annual Cost for year 1:	$11,000 /yr	**$169,000**
Operation and maintenance of Bowling Green VOC treatment processes[d]		Annual Cost year 2000:	$83,000 /yr	
		Replacement of air stripping tower after year 20:	$200,000	**$1,476,000**
PRESENT WORTH				
Based on a 30-yr life and a 5% discount rate				***$2,213,000***
				SAY $2.2 million

a - Unit costs are for year 2000
b - Costs rounded to the nearest $1,000
c - Legal and administrative costs to community that are not included in cost estimate.
d - Refer to Alternative 1 (Table 12-2) for itemized Bowling Green O&M costs.
LS - Lump sum.

12.2.4 **Alternatives 4A and 5A: Remediation to Designated Depths with In-Well Vapor Stripping/Vapor Treatment**

Alternatives 4A and 5A employ in-well vapor stripping to address the off-site groundwater contamination. Alternative 4A includes the in-situ volatilization of groundwater contaminants in the upper portion of the aquifer (located at approximately 55 to 125 ft bgs) using in-well vapor stripping technology. "Hot spot" areas of contamination are targeted in Alternative 4A. Alternative 5A also addresses "hot spot" areas within the off-site groundwater, but targets contamination in the upper and deep portions of the aquifer (located at depths to 200 ft bgs). For each of these in-well vapor stripping alternatives, extracted vapor is treated at the surface using vapor phase GAC. Natural attenuation is assumed under both of these alternatives to assist in achieving remedial objectives. The alternatives are described in Chapter 11. The alternatives employ local VOC treatment systems. This section provides an analysis of the in-well vapor stripping technology used in Alternatives 4A and 5A with respect to the first seven evaluation criteria. Table 12-1 provides a comparative evaluation of the in-well vapor stripping alternatives.

12.2.4.1 ***Protection of Human Health and the Environment.*** Alternatives 4A and 5A are protective of human health and the environment through the active reduction of contaminant levels in the groundwater and by controlling further spread of the contaminant plumes. However, only "hot spot" areas of contamination are addressed in these two alternatives.

Alternatives 4A and 5A provide treatment of the contaminated off-site groundwater, but target different depths of contamination. Alternative 4A addresses the upper portion of the aquifer (to a depth of 125 ft bgs), and Alternative 5A remediates the upper and deep portions of the aquifer (to a depth of 200 ft bgs). Both Alternative 4A and 5A address "hot spot" areas of off-site groundwater contamination, and rely on natural attenuation to help achieve remedial objectives. Since Alternative 5A addresses the upper and deep portions of the aquifer, it is the more protective of these two in-well vapor stripping alternatives.

12.2.4.2 ***Compliance With SCGs.*** Alternatives 4A and 5A are anticipated to achieve compliance with chemical-specific SCGs that apply to the respective treatment depths of the contaminated off-site groundwater over time. In addition, the water district is responsible for meeting drinking water standards before supplying its users with potable water.

There are no promulgated air quality standards for the COCs in the off-site groundwater under the NAAQS or NYAAQS. However, emissions from the vapor treatment systems should comply with the guidance values of NYS Air Guide 1 discussed in Chapter 7 of this report. The remedial activities included in these alternatives (i.e., installation of stripper wells, treatment of contaminated groundwater, natural attenuation) are not expected to generate any air emissions that would exceed the NIOSH IDLH levels, OSHA PELs, and ACGIH TLVs for contaminants in air. Air monitoring will be conducted during the remedial activities to ensure that all requirements are met. Any VOCs volatilized and extracted from the groundwater will be removed by GAC to control emissions to the atmosphere.

Alternatives 4A and 5A will comply with location-specific SCGs that regulate remediation construction projects overlying a sole source aquifer by the construction of a secondary spill containment system around any chemical storage areas to prevent spill migration.

Alternatives 4A and 5A also comply with Federal and state regulatory requirements, which state that the selected remedial alternative must attain a cleanup level that eliminates, reduces, or controls risks to human health and the environment. Under these alternatives, contaminants in groundwater will be addressed by active remediation and natural attenuation.

12.2.4.3 ***Reduction of Toxicity, Mobility, and Volume Through Treatment.*** Alternatives 4A and 5A will reduce the volume of contamination present by injecting air into the wells, volatilizing the VOCs in the groundwater, and extracting the volatilized contaminants for subsequent treatment. Extracting VOCs from the groundwater phase effectively reduces their toxicity, mobility, and volume in the underlying aquifer. The extracted VOCs will be adsorbed onto vapor phase GAC, where their mobility, volume, and toxicity will be reduced. Reductions in toxicity, mobility, and volume of VOCs will be the greater under Alternatives 5A (i.e., remediation to depth of 200 ft bgs).

12.2.4.4 ***Short-Term Effectiveness.*** The installation of in-well vapor stripping wells, air injection equipment, and localized vapor treatment vaults is expected to result in minimal impacts to human health or the environment. However, residential/institutional activities may temporarily be impacted during installation and startup, and slightly increased local traffic and noise are expected. Off-site locations (e.g., active roadways) will be temporarily impacted by the remedial activities due to treatment system installation. Minimal space is required under Alternatives 4A and 5A, as local treatment vaults (each with a ground surface footprint of approximately 150 ft^2) will be installed in the subsurface adjacent to each of the treatment wells.

12.2.4.5 ***Long-Term Effectiveness and Permanence.*** Alternatives 4A and 5A are intended, over time, to remove VOCs permanently from the contaminated off-site groundwater, at depths to 125 ft and 200 ft bgs, respectively. The estimated timeframes for operating the in-well vapor stripping systems, based on information obtained from experienced vendors of the in-well vapor stripping technology, is about seven years for Alternative 4A and nine years for Alternative 5A, as described in Chapter 11. Both alternatives assume an overall project life of 20 years, as several years of natural attenuation (13 years under Alternative 4A and 11 years under Alternative 5A) are assumed to be required subsequent to the active treatment in order to achieve the remedial objectives. The long-term effectiveness of these alternatives will be optimized by assessing aquifer characteristics, appropriate design of the air delivery and vapor extraction systems, and the rate of chemical reaction and desorption of the VOC contaminants from aquifer soil particles as required prior to volatilization of the contaminants from the groundwater. The actual timeframes for the Alternative 4A and 5A remedial actions may actually be longer if the existing site conditions prove to be less than ideal. Once the in-well vapor stripping system is operational, performance will be monitored through periodic vapor and groundwater monitoring. Pilot tests of this technology would lead to better estimates of the required remedial timeframes. Continued treatment of the groundwater supply for potable purposes (as is currently done) will also minimize the potential for human exposure to NCIA off-site groundwater contaminants.

12.2.4.6 ***Implementability.*** Installation of the in-well vapor stripping wells and equipment can be achieved in the off-site area; however, a limited number of vendors are available that are licensed to construct and operate the in-well vapor stripping technology. The vapor treatment system recommended in these alternatives is a commonly applied technology that is readily implementable. However, potential negative public perceptions concerning placement of the remediation system along with local permits that would be required will need to be addressed.

12.2.4.7 ***Cost.*** Estimated capital and long-term O&M costs for Alternatives 4A and 5A are included in Tables 12-5 and 12-6, respectively. Long-term costs for these alternatives include the operation and maintenance of the Bowling Green VOC treatment processes. These costs are based on the assumptions included in the description of the alternatives provided in Chapter 11 and have a range of accuracy of -30 to +50%. Annual O&M costs are estimated on the project life assumed for each alternative and based on a 5% discount rate (EPA 1988) to estimate the present worth cost.

In deriving cost estimates for Alternatives 4A and 5A, installation of UVB in-well vapor stripping systems was assumed. Costs for several line items were obtained from a vendor familiar with UVB installation and operation and maintenance issues. Being that in-well vapor stripping is an innovative technology at hazardous waste sites and is still being optimized, capital costs for the system are fairly high. Like many innovative technologies, costs decrease with successive applications. Capital costs for the in-well vapor stripping technology vary widely; therefore, the cost estimates presented in Chapter 12 (Tables 12-5 and 12-6) may decrease substantially if quotes are obtained for in-well vapor stripping technologies other than the UVB system. Appendix K provides a brief sensitivity analysis that was performed for an alternative (DDC) in-well vapor stripping system.

12.2.5 Alternatives 4B and 5B: Remediation to Designated Depths with Groundwater Extraction/Air Stripping/Vapor Treatment /Reinjection

Alternatives 4B and 5B employ groundwater extraction/air stripping ("pump and treat") to address the off-site groundwater contamination. Both alternatives are described in Chapter 11. Alternative 4B addresses the upper portion of the off-site groundwater contamination (to a depth of 125 ft bgs); Alternative 5B remediates the upper and deep portions of the aquifer (to a depth of 200 ft bgs). "Hot spot" areas of contamination are targeted in Alternatives 4B and 5B. Both alternatives also employ natural attenuation to assist in achieving remedial objectives. Centralized VOC treatment is assumed for these pump and treat alternatives. This section provides an analysis of the pump and treat technology used in both Alternatives 4B and 5B with respect to the first seven evaluation criteria. Table 12-1 provides a comparative evaluation of the groundwater extraction/air stripping alternatives.

12.2.5.1 ***Protection of Human Health and the Environment.*** Alternatives 4B and 5B include the extraction of contaminated groundwater from the underlying aquifers and

TABLE 12-5 (Page 1 of 2)

COST ESTIMATE FOR ALTERNATIVE 4A: IN-WELL VAPOR STRIPPING/VAPOR TREATMENT LOCALIZED DELIVERY AND VAPOR TREATMENT UPPER AQUIFER REMEDIATION (TO 125 FT BGS)

New Cassel Industrial Area Off-site Groundwater

ITEM	UNIT COST ($)[a]		QUANTITY	COST (2000 $)[b]	Present Worth Cost
CAPITAL COSTS					
A. Direct Costs					
Pilot Test	LS			$105,000	
Site Preparation					
Contractor mobilization/demobilization	LS			$29,000	
Installation of Monitoring Wells					
Intermediate/deep well couplets (70 and 200 ft bgs)	$15,000	/couplet	3 couplets	$45,000	
Intermediate/deep well couplets (100 and 250 ft bgs)	$21,000	/couplet	3 couplets	$63,000	
Well/Remediation System Installation/Start-up					
Stripping Wells includes electrical components/controls	$68,000	/well	4 wells	$272,000	
Phone Line and Auto Dialer	$700	/unit	4 units	$3,000	
Condensate Storage Container	$640	/unit	4 units	$3,000	
Soil Disposal (nonhazardous)	$110	/cy	210 cy	$23,000	
Vapor Treatment GAC Installation	LS			$15,000	
			Subtotal	$558,000	
B. Indirect Costs					
Engineering and Design @ 15%				$84,000	
Legal and Administrative @ 10%				$56,000	
Contingency @ 25%				$140,000	
			Total	$838,000	**$838,000**

TABLE 12-5 (Page 2 of 2)

COST ESTIMATE FOR ALTERNATIVE 4A: IN-WELL VAPOR STRIPPING/VAPOR TREATMENT LOCALIZED DELIVERY AND VAPOR TREATMENT UPPER AQUIFER REMEDIATION (TO 125 FT BGS)

New Cassel Industrial Area Off-site Groundwater

ITEM	UNIT COST ($)[a]		QUANTITY	COST (2000 $)[b]	Present Worth Cost
O&M COSTS					
Part-time Operator Attention (years 1-7)	$35,000	/yr			
			Annual cost for year 1:	$35,000 /yr	$203,000
Condensate Control (years 1-7)	$3.00	/gal	6,000 gallons		
			Annual cost for year 1 (860 gallons):	$3,000 /yr	$17,000
GAC maintenance					
Year 1	$2.05	/lb	7,900 lb		
			Annual cost for year 1:	$16,000 /yr	$16,000
Year 2 - 7	$2.05	/lb	23,700 lb		
			Annual cost for year 2 (assume 4000 lb GAC):	$8,000 /yr	$39,000
Vapor Monitoring					
Year 1: samp emission (once per 2 mo)	$3,500	/event	6 events		
			Annual cost for year 1:	$21,000 /yr	$21,000
Year 2-7: samp emission (twice per year)	$3,500	/event	12 events		
			Annual cost for year 2:	$7,000 /yr	$34,000
Long-term groundwater monitoring program					
Years 1-2: Quarterly, 28 wells, VOCs	$500	/well	224 wells		
			Annual cost for year 1 (112 wells):	$56,000 /yr	$104,000
Years 3-20: Annual, 28 wells, VOC's	$500	/well	504 wells		
			Annual cost for year 3 (28 wells):	$14,000 /yr	$148,000
Repair/replacement of equipment					
General @ 5% per year (years 1-7)	$5,000	/yr	7 yrs		
			Annual cost for year 1:	$5,000 /yr	$29,000
Replacement of 3 wells every 5 years (years 1-20)	$18,000	/well			
			Annual cost for year 1:	$11,000 /yr	$137,000
Electricity (years 1-7)	$0.10	/kw-hr	2,146,200 kw-hr		
			Annual cost for year 1:	$31,000 /yr	$179,000
Operation and maintenance of Bowling Green VOC treatment processes[c]					
			Annual cost for year 2000:	$83,000	$1,034,000
PRESENT WORTH					
Based on 7 years of operation, 20 years of groundwater monitoring, and a 5% discount rate.					***$2,799,000***
					SAY $2.8 Million

a - Unit costs are for year 2000
b - Costs rounded to the nearest $1000.
c - Refer to Alternative 1 (Table 12-2) for itemized Bowling Green O&M costs. Cost includes GAC vessel O&M (including vessel replacement at year 10), air stripper O&M, control/electrical system O&M, electricity, and administrative costs over 20 year period. Cost does not include replacement of air stripping tower
LS - Lump sum

R2-0000652

TABLE 12-6 (Page 1 of 2)

COST ESTIMATE FOR ALTERNATIVE 5A:
IN-WELL VAPOR STRIPPING/VAPOR TREATMENT
LOCALIZED DELIVERY AND VAPOR TREATMENT
INTERMEDIATE/DEEP AQUIFER REMEDIATION (TO 200 FT BGS)

New Cassel Industrial Area Off-site Groundwater

ITEM	UNIT COST ($)[a]		QUANTITY	COST (2000 $)[b]	Present Worth Cost
CAPITAL COSTS					
A. Direct Costs					
Pilot Test	LS			$105,000	
Site Preparation					
Contractor mobilization/demobilization	LS			$39,000	
Installation of Monitoring Wells					
Intermediate/deep well couplets (70 and 200 ft bgs)	$15,000	/couplet	3 couplets	$45,000	
Intermediate/deep well couplets (100 and 250 ft bgs)	$21,000	/couplet	3 couplets	$63,000	
Well/Remediation System Installation/Start-up					
Stripping Wells includes electrical components/controls	$75,000	/well	6 wells	$450,000	
Phone Line and Auto Dialer	$700	/unit	6 units	$4,000	
Condensate Storage Container	$635	/unit	6 units	$4,000	
Soil Disposal (nonhazardous)	$110	/cy	310 cy	$34,000	
Vapor Treatment GAC Installation	LS			$32,000	
			Subtotal	$776,000	
B. Indirect Costs					
Engineering and Design @ 15%				$116,000	
Legal and Administrative @ 10%				$78,000	
Contingency @ 25%				$194,000	
			Total	$1,164,000	**$1,164,000**

R2-0000653

COST ESTIMATE FOR ALTERNATIVE 5A: IN-WELL VAPOR STRIPPING/VAPOR TREATMENT LOCALIZED DELIVERY AND VAPOR TREATMENT INTERMEDIATE/DEEP AQUIFER REMEDIATION (TO 200 FT BGS)

New Cassel Industrial Area Off-site Groundwater

ITEM	UNIT COST ($)[a]		QUANTITY	COST (2000 $)[b]	Present Worth Cost
O&M COSTS					
Half-time Operator Attention (years 1-9)	$50,000	/yr			
			Annual cost for year 1:	$50,000 /yr	$355,000
Condensate Control (years 1-9)	$3.00	/gal	16,400 gal		
			Annual cost for year 1 (assume 1800 gallons):	$5,000 /yr	$36,000
GAC maintenance					
Year 1	$2.05	/lb	15,800 lb		
			Annual cost for year 1:	$32,000 /yr	$32,000
Year 2 - 9	$2.05	/lb	62,900 lb		
			Annual cost for year 2 (assume 7900 lb GAC):	$16,000 /yr	$98,000
Vapor Monitoring					
Year 1: samp emission (once per 2 mo)	$3,500	/event	6 events		
			Annual cost for year 1:	$21,000 /yr	$21,000
Year 2-9: samp emission (twice per year)	$3,500	/event	16 events		
			Annual cost for year 2:	$7,000 /yr	$43,000
Long-term groundwater monitoring program					
Years 1-2: Quarterly, 28 wells, VOCs	$500	/well	224 wells		
			Annual cost for year 1 (112 wells):	$56,000 /yr	$104,000
Years 3-20: Annual, 28 wells, VOC's	$500	/well	504 wells		
			Annual cost for year 3 (28 wells):	$14,000 /yr	$148,000
Repair/replacement of equipment					
General @ 5% per year (years 1-9)	$8,000	/yr	9 yrs		
			Annual cost for year 1:	$8,000 /yr	$57,000
Replacement of 3 wells every 5 years (years 1-20)	$18,000	/well			
			Annual cost for year 1:	$11,000 /yr	$137,000
Electricity (years 1-9)	$0.10	/kw-hr	4,139,100 kw-hr		
			Annual cost for year 1:	$46,000 /yr	$327,000
Operation and maintenance of Bowling Green VOC treatment processes[c]					
			Annual cost for year 2000:	$83,000 /yr	$1,034,000
PRESENT WORTH					
Based on 9 years of operation, 20 years of groundwater monitoring, and a 5% discount rate.					***$3,556,000***
					SAY $3.6 Million

a - Unit costs are for year 2000.
b - Costs rounded to the nearest $1000.
c - Refer to Alternative 1 (Table 12-2) for itemized Bowling Green O&M costs. Cost includes GAC vessel O&M (including vessel replacement at year 10), air stripper O&M, control/electrical system O&M, electricity, and administrative costs over 20 year period. Cost does not include replacement of air stripping tower.
LS - Lump sum

treatment at the surface to remove VOC contaminants. In the treatment process (air stripping), VOCs are transferred from the water to the vapor phase, then adsorbed onto GAC. The treated effluent is returned to the subsurface via underground injection wells (wet wells). Alternatives 4B and 5B are protective of human health and the environment because they reduce contaminant levels in the groundwater and control further migration of the contaminant plumes. However, only "hot spot" areas of contamination are addressed in these two alternatives.

Alternatives 4B and 5B provide treatment of the contaminated off-site groundwater, but target different depths of contamination. Alternative 4B addresses the upper portion of the aquifer, and Alternative 5B remediates the upper and deep portions of the aquifer. Both Alternative 4B and 5B address "hot spot" areas of off-site groundwater contamination, and rely on natural attenuation to help achieve remedial objectives. Since Alternative 5B addresses the upper and deep portions of the aquifer, it is the more protective of these two pump and treat alternatives.

12.2.5.2 ***Compliance With SCGs.*** Alternatives 4B and 5B are anticipated to achieve compliance with chemical-specific SCGs that apply to the respective treatment depths of the contaminated off-site groundwater over time. Treated effluent from the Alternative 4B and 5B groundwater treatment systems will meet all applicable groundwater effluent criteria prior to being discharged to nearby wet wells.

There are no promulgated air quality standards for the COCs in the off-site groundwater under the NAAQS or NYAAQS. However, emissions from the groundwater treatment plant should comply with the guidance values of NYS Air Guide 1 discussed in Chapter 7 of this report. The remedial activities included in these alternatives (i.e., installation of extraction wells, treatment of groundwater, natural attenuation) are not expected to generate any air emissions that would exceed the NIOSH IDLH levels, OSHA PELs, and ACGIH TLVs for contaminants in air. Air monitoring will be conducted during the remedial activities to ensure that these requirements are met. Any VOCs volatilized and extracted from the groundwater will be removed by GAC to control emissions to the atmosphere.

Alternatives 4B and 5B will comply with location-specific SCGs that regulate remediation construction projects overlying a sole source aquifer by constructing a secondary spill containment system around any chemical storage areas to prevent spill migration.

Alternatives 4B and 5B also comply with Federal and state regulatory requirements, which state that the selected remedial alternative must attain a cleanup level that eliminates, reduces, or controls risks to human health and the environment. Under these alternatives, contaminants in groundwater will be addressed by active remediation and natural attenuation.

12.2.5.3 ***Reduction of Toxicity, Mobility, and Volume Through Treatment.*** Alternatives 4B and 5B will reduce the toxicity, mobility, and volume of contaminants underlying the NCIA off-site area by extracting and treating the contaminated groundwater. VOCs will be stripped from the water phase and adsorbed onto vapor phase GAC, thereby reducing their mobility, volume, and toxicity in the environment. Reductions in toxicity, mobility, and volume of VOCs will be greater under Alternative 5B (i.e., remediation to a depth of 200 ft bgs).

12.2.5.4 ***Short-Term Effectiveness.*** The installation of pumping wells, a groundwater treatment system, and wet wells is expected to result in minimal impacts to human health or the environment. However, residential/institutional activities may temporarily be impacted during installation and startup, and slightly increased local traffic and noise are expected. Off-site locations (e.g., active roadways) will be temporarily impacted by the remedial activities due to trenching and treatment system installation. Under Alternatives 4B and 5B, central treatment structures will be constructed (approximate size of 3200 sf). It is estimated that approximately 3700 l.f. of roadway trenching will be required under both Alternatives 4B and 5B.

12.2.5.5 ***Long-Term Effectiveness and Permanence.*** Alternatives 4B and 5B are intended, over time, to remove VOCs permanently from the contaminated off-site groundwater, at depths to 125 ft and 200 ft bgs, respectively. The estimated timeframes for operating the pump and treat systems are about nine years for Alternative 4B and 12 years for Alternative 5B, as described in Chapter 11. Both alternatives assume an overall project life of 20 years, as several years of natural attenuation (11 years under Alternative 4B and 8 years under Alternative 5B) are assumed to be required subsequent to the active treatment in order to achieve the remedial objectives. The long-term effectiveness of these alternatives will be optimized by assessing aquifer characteristics, appropriate design of the pumping, treatment, and re-injection systems, and the rate of chemical reaction and desorption of the VOC contaminants from aquifer soil particles as required prior to treatment. The actual timeframes for the Alternative 4B and 5B remedial actions may actually be longer if the existing subsurface conditions prove to be less than ideal. Once the groundwater extraction/air stripping system is operational, performance will be monitored through periodic vapor and groundwater monitoring. Aquifer pump tests and pilot tests of this technology would lead to better estimates of the required remedial timeframes. Continued treatment of the groundwater supply for potable purposes (as is currently done) will also minimize the potential for human exposure to NCIA off-site groundwater contaminants.

12.2.5.6 ***Implementability.*** The technologies required for installing extraction and injection wells and constructing groundwater treatment systems are readily available. The vapor treatment system recommended in these alternatives is a commonly applied technology that is readily implementable. However, potential negative public perceptions concerning placement of the facilities along with local permits that would be required will need to be addressed. For Alternatives 4B and 5B, it is likely that land would need to be acquired for the construction of a treatment building and wet wells for groundwater re-injection.

12.2.5.7 ***Cost.*** Estimated capital and long-term O&M costs for Alternatives 4B and 5B are included in Tables 12-7 and 12-8. Long-term costs for these alternatives include the operation and maintenance of the Bowling Green VOC treatment processes. These costs are based on the assumptions included in the description of the alternatives provided in Chapter 11, and have a range of accuracy of -30 to +50%. Annual O&M costs are estimated on the project life assumed for each alternative and based on a 5% discount rate (EPA 1988) to estimate the present worth cost.

12.2.6 Alternatives 6A and 7A: Full Plume Remediation to Designated Depths with In-Well Vapor Stripping/Vapor Treatment

Alternatives 6A and 7A employ in-well vapor stripping as the active remediation technology to address the off-site groundwater contamination. Alternatives 6A and 7A remediate the aerial extent of the off-site groundwater contamination (to the designated depths) to Class GA groundwater standards. The upper portion of the aquifer (to a depth of 125 ft bgs) is addressed in Alternative 6A, and the upper and deep portions of the aquifer (to 200 ft bgs) are addressed in Alternative 7A. For each of these in-well vapor stripping alternatives, extracted vapor is treated at the surface using local vapor phase GAC treatment systems. Both of these alternatives are described in Chapter 11. This section

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COST ESTIMATE FOR ALTERNATIVE 4B: GROUNDWATER EXTRACTION/AIRSTRIPPING/RE-INJECTION

(REMEDIATION OF AQUIFER TO 125 FT BGS)

New Cassel Industrial Area Off-Site

ITEM	UNIT COST ($) [a]		QUANTITY	COST (2000 $) [b]	Present Worth Cost
CAPITAL COSTS					
A. Direct Costs					
Treatability Study	LS			$20,000	
Aquifer Pump Test [1] (includes treatment)	$60,000		3	$180,000	
Site Preparation					
Contractor Mobilization/Demobilization	LS			$76,000	
Well Installation					
Drilling and Installation of 110-ft Extraction Well	$31,000	/well	3 wells	$93,000	
Disposal of Soil as Nonhazardous (110-ft well)	$110	/yd³	9.6 yd³	$1,000	
Drilling and Installation of 80-ft Extraction Well	$22,000	/well	1 wells	$22,000	
Disposal of Soil as Nonhazardous (80-ft well)	$110	/yd³	2.3 yd³	$1,000	
Pump, Transducer, Concrete Encasement	$5,000	/well	4 wells	$20,000	
Installation of Connection Piping					
Trenching, Bedding, Pipe, Conduit	$35.00	/lf	3,700 lf	$130,000	
Asphalt Removal, Disposal, Restoration	$42.74	/lf	3,700 lf	$158,000	
Groundwater Treatment					
Treatment System Equipment	LS		-	$352,000	
Air Stripper	$43,000	/unit	1 unit	$43,000	
Electrical Components and Controls	LS		-	$60,000	
Housing for Treatment Operations	LS		-	$208,000	
Infiltration Wells					
Wet Well (8-ft diameter, 15-ft deep)	$20,000	/ well	4 wells	$80,000	
Installation of Monitoring Wells					
Intermediate/deep well couplets (70 and 200 ft bgs)	$15,000	/couplet	3 couplets	$45,000	
Intermediate/deep well couplets (100 and 250 ft bgs)	$21,000	/couplet	3 couplets	$63,000	
			Subtotal:	$1,552,000	
B. Indirect Costs					
Engineering and Design (15%)				$233,000	
Legal and Administrative (10%)				$155,000	
Contingency (25%)				$388,000	
			Total:	$2,328,000	**$2,328,000**

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COST ESTIMATE FOR ALTERNATIVE 4B: GROUNDWATER EXTRACTION/AIRSTRIPPING/RE-INJECTION

(REMEDIATION OF AQUIFER TO 125 FT BGS)

New Cassel Industrial Area Off-Site

ITEM	UNIT COST ($) [a]		QUANTITY	COST (2000 $) [b]	Present Worth Cost
O&M COSTS					
Electrical Usage (years 1 - 9)	$0.10	/kW-hr	1,655,640 kW-hr		
			Annual cost for year 1:	$18,000 /yr	$128,000
Chemical Usage (years 1 - 9)	$36,000	/year	9 years		
			Annual cost for year 1:	$36,000 /yr	$256,000
Sludge Disposal (Nonhazardous) (years 1-9)	$2.50	/gallon	1,980 gallon		
			Annual cost for year 1 (220 gallons):	$1,000 /yr	$7,000
Plant Operator (Half-Time)	$50,000	/year	9 years		
			Annual cost for year 1:	$50,000 /yr	$355,000
Vapor Phase GAC					
Carbon, first year	$2.05	/lb	9,250 lb		
			Annual cost for year 1:	$19,000 /yr	$19,000
Carbon (years 2 through 5)	$2.05	/lb	23,200 lb		
			Annual cost for year 2 (assume 5800 lb GAC):	$12,000 /yr	$41,000
Carbon (years 6 though 9)	$2.05	/lb	11,600 lb		
			Annual cost for year 6 (assume 2900 lb GAC):	$6,000 /yr	$17,000
System Monitoring [2]					
System Sampling (first year)	$500	/sample	152 samples		
System Sampling (years 2 through 9)	$500	/sample	160 samples		
			Annual cost for year 1:	$76,000 /yr	$76,000
			Annual cost for year 2:	$10,000 /yr	$62,000
Waste Characteristization of Sludge (first year)	LS			$1,500 /yr	$2,000
Air Monitoring (first year)	$1,000	/sample	6 samples		
Air Monitoring (years 2 through 9)	$1,000	/sample	16 samples		
			Annual cost for year 1:	$6,000 /yr	$6,000
			Annual cost for year 2:	$2,000 /yr	$12,000
Long-Term Groundwater Monitoring Program					
Quarterly sampling of 28 wells (years 1 to 2)	$500	/well	224 wells		
			Annual cost for year 1 (112 wells):	$56,000 /yr	$104,000
Annual sampling of 28 wells (years 3 to 20)	$500	/well	504 wells		
			Annual cost for year 3 (28 wells):	$14,000 /yr	$148,000
Replacement of 3 wells every 5 years	$18,000	/well			
			Annual cost for year 1:	$11,000 /yr	$137,000
Repair/Replacement of Equipment/Well Development (years 1-9)					
(5% of all treatment equipment)	$23,000	/yr			
(10% of infiltration gallery)	$8,000	/yr			
			Annual cost for year 1:	$31,000 /yr	$220,000
Operation and maintenance of Bowling Green VOC treatment processes [c]					
			Annual cost for year 2000:	$83,000 /yr	$1,034,000
TOTAL PRESENT WORTH COST FOR ALTERNATIVE:					***$4,952,000***
Based on 9 years of operation, 20 years of groundwater monitoring, and a 5% discount rate.					**Say $5.0 Million**

a - Unit costs are for year 2000.
b - Costs rounded to the nearest $1000.
c - Refer to Alternative 1 (Table 12-2) for itemized Bowling Green O&M costs. Cost includes GAC vessel O&M (including vessel replacement at year 10), air stripper O&M, control/electrical system O&M, electricity, and administrative costs over 20 year period. Cost does not include replacement of air stripping tower.
LS - Lump sum.
1 - Includes one pilot test well.
2 - Includes system performance, groundwater monitoring of extraction wells, and air emissions testing.
- Possible land acquisition costs are not included in the cost estimate.

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COST ESTIMATE FOR ALTERNATIVE 5B: GROUNDWATER EXTRACTION/AIRSTRIPPING/RE-INJECTION

(REMEDIATION OF AQUIFER TO 200 FT BGS)

New Cassel Industrial Area Off-Site

ITEM	UNIT COST ($) [a]		QUANTITY	COST (2000 $) [a]	Present Worth Cost
CAPITAL COSTS					
A. Direct Costs					
Treatability Study	LS			$20,000	
Aquifer Pump Test [1] (includes treatment)	$60,000		3	$180,000	
Site Preparation					
Contractor Mobilization/Demobilization	LS			$79,000	
Well Installation					
Drilling and Installation of 150-ft Extraction Well	$42,000	/well	3 wells	$126,000	
Disposal of Soil as Nonhazardous (150-ft well)	$110	/yd³	13.2 yd³	$1,000	
Drilling and Installation of 80-ft Extraction Well	$22,000	/well	1 wells	$22,000	
Disposal of Soil as Nonhazardous (80-ft well)	$110	/yd³	2.3 yd³	$1,000	
Pump, Transducer, Concrete Encasement	$5,000	/well	4 wells	$20,000	
Installation of Connection Piping					
Trenching, Bedding, Pipe, Conduit	$35.00	/lf	3,850 lf	$135,000	
Asphalt Removal, Disposal, Restoration	$42.74	/lf	3,850 lf	$165,000	
Groundwater Treatment					
Treatment System Equipment	LS		-	$352,000	
Air Stripper	$43,000	/unit	1 unit	$43,000	
Electrical Components and Controls	LS		-	$60,000	
Housing for Treatment Operations	LS		-	$208,000	
Infiltration Wells					
Wet Well (8-ft diameter, 15-ft deep)	$20,000	/ well	4 wells	$80,000	
Installation of Monitoring Wells					
Intermediate/deep well couplets (70 and 200 ft bgs)	$15,000	/couplet	3 couplets	$45,000	
Intermediate/deep well couplets (100 and 250 ft bgs)	$21,000	/couplet	3 couplets	$63,000	
			Subtotal:	$1,600,000	
B. Indirect Costs					
Engineering and Design (15%)				$240,000	
Legal and Administrative (10%)				$160,000	
Contingency (25%)				$400,000	
			Total:	$2,400,000	**$2,401,000**

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COST ESTIMATE FOR ALTERNATIVE 5B: GROUNDWATER EXTRACTION/AIRSTRIPPING/RE-INJECTION

(REMEDIATION OF AQUIFER TO 200 FT BGS)

New Cassel Industrial Area Off-Site

ITEM	UNIT COST ($)[a]		QUANTITY	COST (2000 $)[b]		Present Worth Cost
O&M COSTS						
Electrical Usage (years 1 - 12)	$0.10	/kW-hr	2,207,520 kW-hr			
			Annual cost for year 1:	$18,000	/yr	$160,000
Chemical Usage (years 1 - 12)	$36,000	/year	12 years			
			Annual cost for year 1:	$36,000	/yr	$319,000
Sludge Disposal (Nonhazardous) (years 1-12)	$2.50	/gallon	2,640 gallon			
			Annual cost for year 1 (220 gallons):	$1,000	/yr	$9,000
Plant Operator (Half-Time)	$50,000	/year	12 years			
			Annual cost for year 1:	$50,000	/yr	$443,000
Vapor Phase GAC						
Carbon, first year	$2.05	/lb	10,000 lb			
			Annual cost for year 1:	$21,000	/yr	$21,000
Carbon (years 2 through 7)	$2.05	/lb	36,000 lb			
			Annual cost for year 2 (assume 6000 lb GAC):	$12,000	/yr	$58,000
Carbon (years 8 though 12)	$2.05	/lb	10,000 lb			
			Annual cost for year 8 (assume 2000 lb GAC):	$4,000	/yr	$12,000
System Monitoring[1]						
System Sampling (first year)	$500	/sample	152 samples			
System Sampling (years 2 through 12)	$500	/sample	220 samples			
			Annual cost for year 1:	$76,000	/yr	$76,000
			Annual cost for year 2:	$10,000	/yr	$79,000
Waste Characteristization of Sludge (first year)	LS			$1,500	/yr	$2,000
Air Monitoring (first year)	$1,000	/sample	6 samples			
Air Monitoring (years 2 through 12)	$1,000	/sample	22 samples			
			Annual cost for year 1:	$6,000	/yr	$6,000
			Annual cost for year 2:	$2,000	/yr	$16,000
Long-Term Groundwater Monitoring Program						
Quarterly sampling of 28 wells (years 1 to 2)	$500	/well	224 wells			
			Annual cost for year 1 (112 wells):	$56,000	/yr	$104,000
Annual sampling of 28 wells (years 3 to 20)	$500	/well	504 wells			
			Annual cost for year 3 (28 wells):	$14,000	/yr	$148,000
Replacement of 3 wells every 5 years	$18,000	/well				
			Annual cost for year 1:	$11,000	/yr	$137,000
Repair/Replacement of Equipment/Well Development (years 1-12)						
(5% of all treatment equipment)	$23,000	/yr				
(10% of infiltration gallery)	$8,000	/yr				
			Annual cost for year 1:	$31,000	/yr	$275,000
Operation and maintenance of Bowling Green VOC treatment processes [c]						
			Annual cost for year 2000:	$83,000	/yr	$1,034,000
TOTAL PRESENT WORTH COST FOR ALTERNATIVE:						***$5,300,000***
Based on 12 years of operation, 20 years of groundwater monitoring, and a 5% discount rate.						**Say $5.3 Million**

a - Unit costs are for year 2000.
b - Costs rounded to the nearest $1000.
c - Refer to Alternative 1 (Table 12-2) for itemized Bowling Green O&M costs. Cost includes GAC vessel O&M (including vessel replacement at year 10), air stripper O&M, control/electrical system O&M, electricity, and administrative costs over 20 year period. Cost does not include replacement of air stripping tower.
LS - Lump sum.
1 - Includes one pilot test well.
2 - Includes system performance, groundwater monitoring of extraction wells, and air emissions testing.
- Possible land acquisition costs are not included in the cost estimate.

provides an analysis of the in-well vapor stripping technology used in Alternatives 6A and 7A with respect to the first seven evaluation criteria. Table 12-1 provides a comparative evaluation of these in-well vapor stripping alternatives.

12.2.6.1 ***Protection of Human Health and the Environment.*** Alternatives 6A and 7A are protective of human health and the environment through the active reduction of contaminant levels in the groundwater and by controlling further spread of the contaminant plumes.

Alternatives 6A and 7A provide full-scale treatment (i.e., NYS Class GA standards are achieved) of the contaminated off-site groundwater to the depths designated in each alternative. Alternative 6A addresses the upper portion of the aquifer (to a depth of 125 ft bgs), and Alternative 7A remediates the upper and deep portions of the aquifer (to a depth of 200 ft bgs). Thus, Alternative 7A is the most protective in-well vapor stripping alternative.

12.2.6.2 ***Compliance With SCGs.*** Alternatives 6A and 7A will achieve compliance with chemical-specific SCGs that apply to the respective treatment depths of the contaminated off-site groundwater, including Class GA groundwater standards, over varying time periods. Active remedial activities under these treatment scenarios will be continued until the Class GA standards are met. Long-term groundwater monitoring is assumed to be carried out for a total of twenty years under these two in-well vapor stripping alternatives to assure that SCGs are being met at deeper depths (i.e., via natural attenuation).

There are no promulgated air quality standards for the COCs in the off-site groundwater under the NAAQS or NYAAQS. However, emissions from the vapor treatment systems should comply with the guidance values of NYS Air Guide 1 discussed in Chapter 7 of this report. The remedial activities included in these alternatives (i.e., installation of stripper wells and the treatment of contaminated groundwater) are not expected to generate any air emissions that would exceed the NIOSH IDLH levels, OSHA PELs, and ACGIH TLVs for contaminants in air. Air monitoring will be conducted during the remedial activities to ensure that all requirements are met. Any VOCs volatilized and extracted from the groundwater will be removed by GAC to control emissions to the atmosphere.

Alternatives 6A and 7A will comply with location-specific SCGs that regulate remediation construction projects overlying a sole source aquifer by the construction of a secondary spill containment system around any chemical storage areas to prevent spill migration.

Alternatives 6A and 7A also comply with Federal and state regulatory requirements, which state that the selected remedial alternative must attain a cleanup level that eliminates, reduces, or controls risks to human health and the environment. Under this alternative, contaminants in groundwater will be removed and then treated at the surface.

12.2.6.3 ***Reduction of Toxicity, Mobility, and Volume Through Treatment.*** Alternatives 6A and 7A will reduce the volume of contamination present by injecting air into the wells, volatilizing the VOCs in the groundwater, and extracting the volatilized contaminants for subsequent treatment. Extracting VOCs from the groundwater phase effectively reduces their toxicity, mobility, and volume in the underlying aquifer. The extracted VOCs will be adsorbed onto vapor phase GAC, where their mobility, volume, and toxicity will be reduced. Reductions in toxicity, mobility, and volume of VOCs will be the greatest under Alternatives 7A (i.e., remediation to depth of 200 ft bgs).

12.2.6.4 ***Short-Term Effectiveness.*** The installation of in-well vapor stripping wells, air injection equipment, and localized vapor treatment vaults is expected to result in minimal impacts to human health or the environment. However, residential/institutional activities may temporarily be impacted during installation and startup, and slightly increased local traffic and noise are expected. Off-site locations (e.g., active roadways) will be temporarily impacted by the remedial activities due to treatment system installation. Minimal space is required under Alternatives 6A and 7A, as local treatment vaults (each with a ground surface footprint of approximately 150 ft^2) will be installed in the subsurface adjacent to each of the treatment wells.

12.2.6.5 ***Long-Term Effectiveness and Permanence.*** Alternatives 6A and 7A are intended to remove VOCs permanently from the contaminated off-site groundwater, at depths to 125 ft and 200 ft bgs, respectively. The estimated timeframes for operating the in-well vapor stripping systems, based on information obtained from experienced vendors of the in-well vapor stripping technology, are about five years for Alternative 6A and seven years for Alternative 7A, as described in Chapter 11. The long-term effectiveness of these alternatives will be optimized by assessing aquifer characteristics, appropriate design of the air delivery and vapor extraction systems, and the rate of chemical reaction and desorption of the VOC contaminants from aquifer soil particles as required prior to volatilization of the contaminants from the groundwater. The actual timeframes for the Alternative 6A and 7A remedial actions may actually be longer if the existing site conditions prove to be less than ideal. Once the in-well vapor stripping system is operational, performance will be monitored through periodic vapor and groundwater monitoring. Pilot tests of this technology would lead to better estimates of the required remedial timeframes. Continued treatment of the groundwater supply for potable purposes (as is currently done) will also minimize the potential for human exposure to NCIA off-site groundwater contaminants. As stated above, a 20-year long-term groundwater monitoring program is assumed for both alternatives.

12.2.6.6 ***Implementability.*** Installation of the in-well vapor stripping wells and equipment can be achieved in the off-site area; however, a limited number of vendors are available that are licensed to construct and operate the in-well vapor stripping technology. The vapor treatment system recommended in these alternatives is a commonly applied technology that is readily implementable. However, potential negative public perceptions concerning placement of the remediation system along with local permits that would be required will need to be addressed.

12.2.6.7 ***Cost.*** Estimated capital and long-term O&M costs for Alternatives 6A and 7A are included in Tables 12-9 and 12-10, respectively. Long-term costs for these alternatives include the operation and maintenance of the Bowling Green VOC treatment processes. These costs are based on the assumptions included in the description of the alternatives provided in Chapter 11 and have a range of accuracy of -30 to +50%. Annual O&M costs are estimated on the project life assumed for each alternative and based on a 5% discount rate (EPA 1988) to estimate the present worth cost.

In deriving cost estimates for Alternatives 6A and 7A, installation of UVB in-well vapor stripping systems was assumed. Costs for several line items were obtained from a vendor familiar with UVB installation and operation and maintenance issues. Being that in-well vapor stripping is an innovative technology at hazardous waste sites and is still being optimized, capital costs for the system are fairly high. Like many innovative technologies, costs decrease with successive applications. Capital costs for the in-well vapor stripping technology vary widely; therefore, the cost estimates presented in Chapter 12 (Tables 12-9 and 12-10) may decrease substantially if quotes are obtained for in-well vapor stripping

TABLE 12-9 (Page 1 of 2)

COST ESTIMATE FOR ALTERNATIVE 6A:
IN-WELL VAPOR STRIPPING/VAPOR TREATMENT
LOCALIZED DELIVERY AND VAPOR TREATMENT
FULL PLUME REMEDIATION - UPPER AQUIFER (TO 125 FT BGS)

New Cassel Industrial Area Off-site Groundwater

ITEM	UNIT COST ($)[a]		QUANTITY	COST (2000 $)[b]	Present Worth Cost
CAPITAL COSTS					
A. Direct Costs					
Pilot Test	LS			$105,000	
Site Preparation					
Contractor mobilization/demobilization	LS			$48,000	
Installation of Monitoring Wells					
Intermediate/deep well couplets (70 and 200 ft bgs)	$15,000	/couplet	3 couplets	$45,000	
Intermediate/deep well couplets (100 and 250 ft bgs)	$21,000	/couplet	3 couplets	$63,000	
Well/Remediation System Installation/Start-up					
Stripping Wells includes electrical components/controls	$68,000	/well	9 wells	$612,000	
Phone Line and Auto Dialer	$700	/unit	9 unit	$6,000	
Condensate Storage Container	$640	/unit	9 units	$6,000	
Soil Disposal (nonhazardous)	$110	/cy	470 cy	$52,000	
Vapor Treatment GAC Installation	LS			$19,000	
			Subtotal	$956,000	
B. Indirect Costs					
Engineering and Design @ 15%				$143,000	
Legal and Administrative @ 10%				$96,000	
Contingency @ 25%				$239,000	
			Total	$1,434,000	**$1,434,000**

Figure 22
Alternative 8
Full Plume Remediation of Upper and Deep Portions of the Aquifer to 225 ft bgs with In-Well Vapor Stripping/Localized Vapor Treatment
New Cassel Industrial Area

TABLE 12-9 (Page 2 of 2)

COST ESTIMATE FOR ALTERNATIVE 6A: IN-WELL VAPOR STRIPPING/VAPOR TREATMENT LOCALIZED DELIVERY AND VAPOR TREATMENT FULL PLUME REMEDIATION - UPPER AQUIFER (TO 125 FT BGS)

New Cassel Industrial Area Off-site Groundwater

ITEM	UNIT COST ($)[a]		QUANTITY	COST (2000 $)[b]	Present Worth Cost
O&M COSTS					
Full-time Operator Attention (years 1-5)	$75,000	/yr	5 yrs		
			Annual cost for year 1:	$75,000 /yr	$325,000
Condensate Control (years 1-5)	$3.00	/gal	7,300 gal		
			Annual cost for year 1 (assume 1460 gallons):	$4,000 /yr	$17,000
GAC maintenance					
Year 1	$2.05	/lb	14,600 lb		
			Annual cost for year 1:	$30,000 /yr	$30,000
Year 2 - 5	$2.05	/lb	29,100 lb		
			Annual cost for year 2 (assume 7300 lb GAC):	$15,000 /yr	$51,000
Vapor Monitoring					
Year 1: samp emission (once per 2 mo)	$3,500	/event	6 events		
			Annual cost for year 1:	$21,000 /yr	$21,000
Year 2-5: samp emission (twice per year)	$3,500	/event	8 events		
			Annual cost for year 2:	$7,000 /yr	$24,000
Long-term groundwater monitoring program					
Years 1-2: Quarterly, 28 wells, VOCs	$500	/well	224 wells		
			Annual cost for year 1 (112 wells):	$56,000 /yr	$104,000
Years 3-20: Annual, 28 wells, VOC's	$500	/well	504 wells		
			Annual cost for year 3 (28 wells):	$14,000 /yr	$148,000
Repair/replacement of equipment					
General @ 5% per year (years 1-5)	$11,000	/yr	5 yrs		
			Annual cost for year 1:	$11,000 /yr	$48,000
Replacement of 3 wells every 5 years (years 1-20)	$18,000	/well			
			Annual cost for year 1:	$11,000 /yr	$137,000
Electricity (years 1-5)	$0.10	/kw-hr	3,449,250 kw-hr		
			Annual cost for year 1:	$69,000 /yr	$299,000
Operation and maintenance of Bowling Green VOC treatment processes[c]					
			Annual cost for year 2000:	$83,000 /yr	$1,034,000
PRESENT WORTH					
Based on 5 years of operation, 20 years of groundwater monitoring, and a 5% discount rate.					***$3,672,000***
					SAY $3.7 Million

a - Unit costs are for year 2000

b - Costs rounded to the nearest $1000

c - Refer to Alternative 1 (Table 12-2) for itemized Bowling Green O&M costs. Cost includes GAC vessel O&M (including vessel replacement at year 10), air stripper O&M, control/electrical system O&M, electricity, and administrative costs over 20 year period. Cost does not include replacement of air stripping tower.

LS - Lump sum

TABLE 12-10 (Page 1 of 2)

COST ESTIMATE FOR ALTERNATIVE 7A:
IN-WELL VAPOR STRIPPING/VAPOR TREATMENT
LOCALIZED DELIVERY AND VAPOR TREATMENT
FULL PLUME REMEDIATION -INTERMEDIATE/DEEP AQUIFER (TO 200 FT BGS)

New Cassel Industrial Area Off-site Groundwater

ITEM	UNIT COST ($)[a]		QUANTITY	COST (2000 $)[b]	Present Worth Cost
CAPITAL COSTS					
A. Direct Costs					
Pilot Test	LS			$105,000	
Site Preparation					
Contractor mobilization/demobilization	LS			$69,000	
Installation of Monitoring Wells					
Intermediate/deep well couplets (70 and 200 ft bgs)	$15,000	/couplet	3 couplets	$45,000	
Intermediate/deep well couplets (100 and 250 ft bgs)	$21,000	/couplet	3 couplets	$63,000	
Well/Remediation System Installation/Start-up					
Stripping Wells includes electrical components/controls	$75,000	/well	13 wells	$975,000	
Phone Line and Auto Dialer	$700	/unit	13 unit	$9,000	
Condensate Storage Container	$635	/unit	13 units	$8,000	
Soil Disposal (nonhazardous)	$110	/cy	680 cy	$75,000	
Vapor Treatment GAC Installation	LS			$56,000	
			Subtotal	$1,405,000	
B. Indirect Costs					
Engineering and Design @ 15%				$211,000	
Legal and Administrative @ 10%				$141,000	
Contingency @ 25%				$351,000	
			Total	$2,108,000	**$2,108,000**

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COST ESTIMATE FOR ALTERNATIVE 7A: IN-WELL VAPOR STRIPPING/VAPOR TREATMENT LOCALIZED DELIVERY AND VAPOR TREATMENT FULL PLUME REMEDIATION -INTERMEDIATE/DEEP AQUIFER (TO 200 FT BGS)

New Cassel Industrial Area Off-site Groundwater

ITEM	UNIT COST ($)[a]		QUANTITY	COST (2000 $)[b]	Present Worth Cost
O&M COSTS					
Full-time Operator Attention (years 1-7)	$75,000	/yr	7 yrs		
			Annual cost for year 1:	$75,000 /yr	$434,000
Condensate Control (years 1-7)	$3.00	/gal	21,300 gal		
			Annual cost for year 1 (assume 3040 gallons):	$9,000 /yr	$52,000
GAC maintenance					
Year 1	$2.05	/lb	27,600 lb		
			Annual cost for year 1:	$57,000 /yr	$57,000
Year 2 - 7	$2.05	/lb	82,800 lb		
			Annual cost for year 2 (assume 13800 lb GAC):	$28,000 /yr	$135,000
Vapor Monitoring					
Year 1: samp emission (once per 2 mo)	$3,500	/event	6 events		
			Annual cost for year 1:	$21,000 /yr	$21,000
Year 2-7: samp emission (twice per year)	$3,500	/event	12 events		
			Annual cost for year 2:	$7,000 /yr	$34,000
Long-term groundwater monitoring program					
Years 1-2: Quarterly, 28 wells, VOCs	$500	/well	224 wells		
			Annual cost for year 1 (112 wells):	$56,000 /yr	$104,000
Years 3-20: Annual, 28 wells, VOC's	$500	/well	504 wells		
			Annual cost for year 3 (28 wells):	$14,000 /yr	$148,000
Repair/replacement of equipment					
General @ 5% per year (years 1-7)	$17,000	/yr	7 yrs		
			Annual cost for year 1:	$17,000 /yr	$98,000
Replacement of 3 wells every 5 years (years 1-20)	$18,000	/well			
			Annual cost for year 1:	$11,000 /yr	$137,000
Electricity (years 1-7)	$0.10	/kw-hr	6,975,150 kw-hr		
			Annual cost for year 1:	$100,000 /yr	$579,000
Operation and maintenance of Bowling Green VOC treatment processes[c]					
			Annual cost for year 2000:	$83,000 /yr	$1,034,000
PRESENT WORTH					
Based on 7 years of operation, 20 years of groundwater monitoring, and a 5% discount rate					***$4,941,000***
					SAY $4.9 Million

a - Unit costs are for year 2000

b - Costs rounded to the nearest $1000

c - Refer to Alternative 1 (Table 12-2) for itemized Bowling Green O&M costs. Cost includes GAC vessel O&M (including vessel replacement at year 10), air stripper O&M, control/electrical system O&M, electricity, and administrative costs over 20 year period. Cost does not include replacement of air stripping tower.

LS - Lump sum.

technologies other than the UVB system. Appendix K provides a brief sensitivity analysis that was performed for an alternative (DDC) in-well vapor stripping system.

12.2.7 Alternatives 6B and 7B: Full Plume Remediation to Designated Depths with Groundwater Extraction/Air Stripping/Vapor Treatment /Reinjection

Alternatives 6B and 7B employ groundwater extraction/air stripping ("pump and treat") as the active remediation technology to address the aerial extent of the off-site groundwater contamination (to the designated depths) to achieve NYS Class GA groundwater standards. Both alternatives are described in Chapter 11. Alternative 6B addresses the upper portion of the off-site groundwater contamination (to a depth of 125 ft bgs); Alternative 7B remediates the upper and deep portions of the aquifer (to a depth of 200 ft bgs). Both alternatives employ centralized VOC treatment. This section provides an analysis of the pump and treat technology used in both Alternatives 6B and 7B with respect to the first seven evaluation criteria. Table 12-1 provides a comparative evaluation of the groundwater extraction/air stripping alternatives.

12.2.7.1 ***Protection of Human Health and the Environment.*** Alternatives 6B and 7B include the extraction of contaminated groundwater from the underlying aquifers and treatment at the surface to remove VOC contaminants. Alternatives 6B and 7B remediate the aerial extent of the off-site groundwater (to the designated depths) to Class GA groundwater standards. In the treatment process (air stripping), VOCs are transferred from the water to the vapor phase, then adsorbed onto GAC. The treated effluent is returned to the subsurface via underground injection wells (wet wells). Alternatives 6B and 7B are protective of human health and the environment because they reduce contaminant levels in the groundwater and control further migration of the contaminant plumes.

Alternatives 6B and 7B provide treatment of the contaminated off-site groundwater (i.e., NYS Class GA standards are achieved), but target different depths of contamination. Alternative 6B addresses the upper portion of the aquifer, and Alternative 7B remediates the upper and deep portions of the aquifer. Thus, Alternative 7B is the most protective groundwater extraction/air stripping alternative.

12.2.7.2 ***Compliance With SCGs.*** Alternatives 6B and 7B will achieve compliance with chemical-specific SCGs that apply to the respective treatment depths of the contaminated off-site groundwater, including Class GA groundwater standards, over varying time periods. Active remedial activities under the treatment scenarios of Alternatives 6B and 7B will be continued until the Class GA standards are met. Treated effluent from the Alternative 6B and 7B groundwater treatment systems will meet all applicable groundwater effluent criteria prior to being discharged to nearby wet wells. Long-term groundwater monitoring is assumed to be carried out for a total of twenty years under these two pump and treat alternatives to assure that SCGs are being met at deeper depths (i.e., via natural attenuation).

There are no promulgated air quality standards for the COCs in the off-site groundwater under the NAAQS or NYAAQS. However, emissions from the groundwater treatment plant should comply with the guidance values of NYS Air Guide 1 discussed in Chapter 7 of this report. The remedial activities included in these alternatives (i.e., installation of extraction wells and the treatment of groundwater) are not expected to generate any air emissions that would exceed the NIOSH IDLH levels, OSHA PELs, and ACGIH TLVs for contaminants in air. Air monitoring will be conducted during the remedial activities to ensure that these requirements are met. Any VOCs volatilized and extracted from the groundwater will be removed by GAC to control emissions to the atmosphere.

Alternatives 6B and 7B will comply with location-specific SCGs that regulate remediation construction projects overlying a sole source aquifer by constructing a secondary spill containment system around any chemical storage areas to prevent spill migration.

Alternatives 6B and 7B also comply with Federal and state regulatory requirements, which state that the selected remedial alternative must attain a cleanup level that eliminates, reduces, or controls risks to human health and the environment. Under these alternatives, contaminants in the NCIA off-site groundwater will be removed and treated at the surface.

12.2.7.3 ***Reduction of Toxicity, Mobility, and Volume Through Treatment.*** Alternatives 6B and 7B will reduce the toxicity, mobility, and volume of contaminants underlying the NCIA off-site area by extracting and treating the contaminated groundwater. VOCs will be stripped from the water phase and adsorbed onto vapor phase GAC, thereby reducing their mobility, volume, and toxicity in the environment. Reductions in toxicity, mobility, and volume of VOCs will be the greatest under Alternative 7B (i.e., remediation to a depth of 200 ft bgs).

12.2.7.4 ***Short-Term Effectiveness.*** The installation of pumping wells, a groundwater treatment system, and wet wells is expected to result in minimal impacts to human health or the environment. However, residential/institutional activities may temporarily be impacted during installation and startup, and slightly increased local traffic and noise are expected. Off-site locations (e.g., active roadways) will be temporarily impacted by the remedial activities due to trenching and treatment system installation. Under Alternatives 6B and 7B, an approximately 4000 ft^2 central treatment structure will be constructed. It is estimated that approximately 9400 l.f. and 10,300 l.f. of roadway trenching will be required under Alternatives 6B and 7B, respectively.

12.2.7.5 ***Long-Term Effectiveness and Permanence.*** Alternatives 6B and 7B are intended to remove VOCs permanently from the contaminated off-site groundwater, at depths to 125 ft and 200 ft bgs, respectively. The estimated timeframes for operating the pump and treat systems are about 7 years for Alternative 6B and 10 years for Alternative 7B, as described in Chapter 11. The long-term effectiveness of these alternatives will be optimized by assessing aquifer characteristics, appropriate design of the pumping, treatment, and re-injection systems, and the rate of chemical reaction and desorption of the VOC contaminants from aquifer soil particles as required prior to treatment. The actual timeframes for the Alternative 6B and 7B remedial actions may actually be longer if the existing subsurface conditions prove to be less than ideal. Once the groundwater extraction/air stripping system is operational, performance will be monitored through periodic vapor and groundwater monitoring. Aquifer pump tests and pilot tests of this technology would lead to better estimates of the required remedial timeframes. Continued treatment of the groundwater supply for potable purposes (as is currently done) will also minimize the potential for human exposure to NCIA off-site groundwater contaminants. As stated above, a 20-year long-term groundwater monitoring program is assumed for both alternatives.

12.2.7.6 ***Implementability.*** The technologies required for installing extraction and injection wells and constructing groundwater treatment systems are readily available. The vapor treatment system recommended in these alternatives is a commonly applied technology that is readily implementable. However, potential negative public perceptions concerning placement of the facilities along with local permits that would be required will need to be addressed. For Alternatives 6B and 7B, it is likely that land would need to be acquired for the construction of a treatment building and wet wells for groundwater re-injection.

12.2.7.7 ***Cost.*** Estimated capital and long-term O&M costs for Alternatives 6B and 7B are included in Tables 12-11 and 12-12. Long-term costs for these alternatives include the operation and maintenance of the Bowling Green VOC treatment processes. These costs are based on the assumptions included in the description of the alternatives provided in Chapter 11, and have a range of accuracy of -30 to +50%. Annual O&M costs are estimated on the project life assumed for each alternative and based on a 5% discount rate (EPA 1988) to estimate the present worth cost.

12.3 COMPARATIVE ANALYSIS OF ALTERNATIVES

In the previous section, each of the remedial alternatives was individually evaluated with respect to the seven evaluation criteria. In this section, the comparative performance of the alternatives is discussed where common elements exist among them. Refer also to Table 12-1 for a comparative evaluation of the alternatives.

12.3.1 ***Protection of Human Health and the Environment.***

Alternatives 1, 2, and 3 provide the least protection of human health and the environment as institutional controls will not be effective in preventing the migration of the contaminant plumes. Contaminants in the off-site groundwater may remain at concentrations above remedial objectives for several years under these alternatives. However, a thorough annual evaluation of monitoring data and remedial options will be performed in Alternative 3.

Of the active treatment remedies, Alternatives 4A and 4B (remediation of "hot spot" areas in the upper portion of the aquifers) provide similar levels of protection in that they each reduce levels of COCs in off-site groundwater to a depth of 125 ft bgs and control further downgradient migration of VOCs. Alternatives 4A and 4B also rely on natural attenuation to achieve remedial objectives for the groundwater contamination. Likewise, Alternatives 5A and 5B provide similar levels of protection to one another (i.e., remediation of "hot spot" areas in upper and deep portions of the off-site groundwater contamination, to a depth of 200 ft bgs). Alternatives 6A and 6B address groundwater contamination in the upper portion of the aquifer so that NYS Class GA standards are met. Alternatives 7A and 7B also achieve Class GA standards through active remediation, but target the upper and deep portions (to 200 ft bgs) of the aquifer. Thus, Alternative 7A or 7B provide the greatest

TABLE 12-11 (Page 1 of 2)

COST ESTIMATE FOR ALTERNATIVE 6B: GROUNDWATER EXTRACTION/AIRSTRIPPING/RE-INJECTION

(REMEDIATION OF AQUIFER TO 125 FT BGS)

New Cassel Industrial Area Off-Site

ITEM	UNIT COST ($) [a]		QUANTITY		COST (2000 $) [b]	Present Worth Cost
CAPITAL COSTS						
A. Direct Costs						
Treatability Study	LS				$20,000	
Aquifer Pump Test [1] (includes treatment)	$60,000		3		$180,000	
Site Preparation						
Contractor Mobilization/Demobilization	LS				$124,000	
Well Installation						
Drilling and Installation of 110-ft Extraction Well	$31,000	/well	11	wells	$341,000	
Disposal of Soil as Nonhazardous (110-ft well)	$110	/yd³	35.2	yd³	$4,000	
Drilling and Installation of 80-ft Extraction Well	$22,000	/well	1	wells	$22,000	
Disposal of Soil as Nonhazardous (80-ft well)	$110	/yd³	2.3	yd³	$1,000	
Pump, Transducer, Concrete Encasement	$5,000	/well	12	wells	$60,000	
Installation of Connection Piping						
Trenching, Bedding, Pipe, Conduit	$35.00	/lf	9,400	lf	$329,000	
Asphalt Removal, Disposal, Restoration	$42.74	/lf	9,400	lf	$402,000	
Groundwater Treatment						
Treatment System Equipment	LS		-		$453,000	
Air Stripper	$61,000	/unit	1	unit	$61,000	
Electrical Components and Controls	LS		-		$60,000	
Housing for Treatment Operations	LS		-		$260,000	
Infiltration Wells						
Wet Well (8-ft diameter, 15-ft deep)	$20,000	/ well	7	wells	$140,000	
Installation of Monitoring Wells						
Intermediate/deep well couplets (70 and 200 ft bgs)	$15,000	/couplet	3	couplets	$45,000	
Intermediate/deep well couplets (100 and 250 ft bgs)	$21,000	/couplet	3	couplets	$63,000	
				Subtotal:	$2,565,000	
B. Indirect Costs						
Engineering and Design (15%)					$385,000	
Legal and Administrative (10%)					$257,000	
Contingency (25%)					$641,000	
				Total:	$3,848,000	**$3,848,000**

TABLE 12-11 (Page 2 of 2)

COST ESTIMATE FOR ALTERNATIVE 6B: GROUNDWATER EXTRACTION/AIRSTRIPPING/RE-INJECTION

(REMEDIATION OF AQUIFER TO 125 FT BGS)

New Cassel Industrial Area Off-Site

ITEM	UNIT COST ($)[a]	QUANTITY	COST (2000 $)[b]	Present Worth Cost
O&M COSTS				
Electrical Usage (years 1 - 7)	$0.10 /kW-hr	3,035,340 kW-hr		
		Annual cost for year 1:	$43,000 /yr	$249,000
Chemical Usage (years 1 - 7)	$92,000 /year	7 years		
		Annual cost for year 1:	$92,000 /yr	$532,000
Sludge Disposal (Nonhazardous) (years 1-7)	$2.50 /gallon	4,000 gallon		
		Annual cost for year 1 (560 gallons):	$1,000 /yr	$6,000
Plant Operator (Full-Time)	$75,000 /year	7 years		
		Annual cost for year 1:	$75,000 /yr	$434,000
Vapor Phase GAC				
Carbon, first year	$2.05 /lb	23,000 lb		
		Annual cost for year 1:	$47,000 /yr	$47,000
Carbon (years 2 through 5)	$2.05 /lb	46,000 lb		
		Annual cost for year 2 (assume 11500 lb GAC):	$24,000 /yr	$81,000
Carbon (years 6 though 7)	$2.05 /lb	7,000 lb		
		Annual cost for year 6 (assume 3500 lb GAC):	$7,000 /yr	$10,000
System Monitoring[2]				
System Sampling (first year)	$500 /sample	248 samples		
System Sampling (years 2 through 7)	$500 /sample	216 samples		
		Annual cost for year 1:	$124,000 /yr	$124,000
		Annual cost for year 2:	$14,000 /yr	$68,000
Waste Characterization of Sludge (first year)	LS		$1,500 /yr	$2,000
Air Monitoring (first year)	$1,000 /sample	6 samples		
Air Monitoring (years 2 through 7)	$1,000 /sample	12 samples		
		Annual cost for year 1:	$6,000 /yr	$6,000
		Annual cost for year 2:	$2,000 /yr	$10,000
Long-Term Groundwater Monitoring Program				
Quarterly sampling of 28 wells (years 1 to 2)	$500 /well	224 wells		
		Annual cost for year 1 (112 wells):	$56,000 /yr	$104,000
Annual sampling of 28 wells (years 3 to 20)	$500 /well	504 wells		
		Annual cost for year 3 (28 wells):	$14,000 /yr	$148,000
Replacement of 3 wells every 5 years	$18,000 /well			
		Annual cost for year 1:	$11,000 /yr	$137,000
Repair/Replacement of Equipment/Well Development (years 1-7)				
(5% of all treatment equipment)	$29,000 /yr	$203,000		
(10% of infiltration gallery)	$14,000 /yr	$98,000		
		Annual cost for year 1:	$43,000 /yr	$249,000
Operation and maintenance of Bowling Green VOC treatment processes[c]				
		Annual cost for year 2000:	$83,000 /yr	$1,034,000
TOTAL PRESENT WORTH FOR ALTERNATIVE:				***$7,089,000***
Based on 7 years of operation, 20 years of groundwater monitoring, and a 5% discount rate.				**Say $7.1 Million**

a - Unit costs are for year 2000.
b - Costs rounded to the nearest $1000.
c - Refer to Alternative 1 (Table 12-2) for itemized Bowling Green O&M costs. Cost includes GAC vessel O&M (including vessel replacement at year 10), air stripper O&M, control/electrical system O&M, electricity, and administrative costs over 20 year period. Cost does not include replacement of air stripping tower.
LS - Lump sum.
1 - Includes one pilot test well.
2 - Includes system performance, groundwater monitoring of extraction wells, and air emissions testing.
- Possible land acquisition costs are not included in the cost estimate.

TABLE 12-12 (Page 1 of 2)

COST ESTIMATE FOR ALTERNATIVE 7B: GROUNDWATER EXTRACTION/AIRSTRIPPING/RE-INJECTION

(REMEDIATION OF AQUIFER TO 200 FT BGS)
New Cassel Industrial Area Off-Site

ITEM	UNIT COST ($) [a]		QUANTITY	COST (2000 $) [b]	Present Worth Cost
CAPITAL COSTS					
A. Direct Costs					
Treatability Study	LS			$20,000	
Aquifer Pump Test [1] (includes treatment)	$60,000		3	$180,000	
Site Preparation					
Contractor Mobilization/Demobilization	LS			$137,000	
Well Installation					
Drilling and Installation of 150-ft Extraction Well	$42,000	/well	12 wells	$504,000	
Disposal of Soil as Nonhazardous (150-ft well)	$110	/yd³	52.8 yd³	$6,000	
Drilling and Installation of 80-ft Extraction Well	$22,000	/well	1 wells	$22,000	
Disposal of Soil as Nonhazardous (80-ft well)	$110	/yd³	2.3 yd³	$1,000	
Pump, Transducer, Concrete Encasement	$5,000	/well	13 wells	$65,000	
Installation of Connection Piping					
Trenching, Bedding, Pipe, Conduit	$35.00	/lf	10,250 lf	$359,000	
Asphalt Removal, Disposal, Restoration	$42.74	/lf	10,250 lf	$438,000	
Groundwater Treatment					
Treatment System Equipment	LS		-	$453,000	
Air Stripper	$61,000	/unit	1 unit	$61,000	
Electrical Components and Controls	LS		-	$60,000	
Housing for Treatment Operations	LS		-	$260,000	
Infiltration Wells					
Wet Well (8-ft diameter, 15-ft deep)	$20,000	/ well	8 wells	$160,000	
Installation of Monitoring Wells					
Intermediate/deep well couplets (70 and 200 ft bgs)	$15,000	/couplet	3 couplets	$45,000	
Intermediate/deep well couplets (100 and 250 ft bgs)	$21,000	/couplet	3 couplets	$63,000	
			Subtotal:	$2,834,000	
B. Indirect Costs					
Engineering and Design (15%)				$425,000	
Legal and Administrative (10%)				$283,000	
Contingency (25%)				$709,000	
			Total:	$4,251,000	**$4,251,000**

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COST ESTIMATE FOR ALTERNATIVE 7B: GROUNDWATER EXTRACTION/AIRSTRIPPING/RE-INJECTION

(REMEDIATION OF AQUIFER TO 200 FT BGS)

New Cassel Industrial Area Off-Site

ITEM	UNIT COST ($) [a]	QUANTITY	COST (2000 $) [b]	Present Worth Cost
O&M COSTS				
Electrical Usage (years 1 - 10)	$0.10 /kW-hr	4,423,800 kW-hr		
		Annual cost for year 1:	$44,000 /yr	$340,000
Chemical Usage (years 1 - 10)	$99,000 /year	10 years		
		Annual cost for year 1:	$99,000 /yr	$764,000
Sludge Disposal (Nonhazardous) (years 1-10)	$2.50 /gallon	6,000 gallon		
		Annual cost for year 1 (600 gallons):	$2,000 /yr	$15,000
Plant Operator (Full-Time)	$75,000 /year	10 years		
		Annual cost for year 1:	$75,000 /yr	$579,000
Vapor Phase GAC				
Carbon, first year	$2.05 /lb	23,000 lb		
		Annual cost for year 1:	$47,000 /yr	$47,000
Carbon (years 2 through 6)	$2.05 /lb	67,500 lb		
		Annual cost for year 2 (assume 13500 lb GAC):	$28,000 /yr	$115,000
Carbon (years 7 though 10)	$2.05 /lb	18,000 lb		
		Annual cost for year 7 (assume 4500 lb GAC):	$9,000 /yr	$24,000
System Monitoring [1]				
System Sampling (first year)	$500 /sample	260 samples		
System Sampling (years 2 through 10)	$500 /sample	342 samples		
		Annual cost for year 1:	$130,000 /yr	$130,000
		Annual cost for year 2:	$19,000 /yr	$129,000
Waste Characteristization of Sludge (first year)	LS		$1,500 /yr	$2,000
Air Monitoring (first year)	$1,000 /sample	6 samples		
Air Monitoring (years 2 through 10)	$1,000 /sample	18 samples		
		Annual cost for year 1:	$6,000 /yr	$6,000
		Annual cost for year 2:	$2,000 /yr	$14,000
Long-Term Groundwater Monitoring Program				
Quarterly sampling of 28 wells (years 1 to 2)	$500 /well	224 wells		
		Annual cost for year 1 (112 wells):	$56,000 /yr	$104,000
Annual sampling of 28 wells (years 3 to 20)	$500 /well	504 wells		
		Annual cost for year 3 (28 wells):	$14,000 /yr	$148,000
Replacement of 3 wells every 5 years	$18,000 /well			
		Annual cost for year 1:	$11,000 /yr	$137,000
Repair/Replacement of Equipment/Well Development (years 1-10)				
(5% of all treatment equipment)	$29,000 /yr			
(10% of infiltration gallery)	$16,000 /yr			
		Annual cost for year 1:	$45,000 /yr	$347,000
Operation and maintenance of Bowling Green VOC treatment processes [c]				
		Annual cost for year 2000:	$83,000 /yr	$1,034,000
TOTAL PRESENT WORTH COST FOR ALTERNATIVE:				***$8,186,000***
Based on 10 years of operation, 20 years of groundwater monitoring, and a 5% discount rate.				**Say $8.2 Million**

a - Unit costs are for year 2000.
b - Costs rounded to the nearest $1000.
c - Refer to Alternative 1 (Table 12-2) for itemized Bowling Green O&M costs. Cost includes GAC vessel O&M (including vessel replacement at year 10), air stripper O&M, control/electrical system O&M, electricity, and administrative costs over 20 year period. Cost does not include replacement of air stripping tower.
LS - Lump sum.
1 - Includes one pilot test well.
2 - Includes system performance, groundwater monitoring of extraction wells, and air emissions testing.
- Possible land acquisition costs are not included in the cost estimate.

protection of human health and the environment, as Class GA standards are achieved for the entire plume area and to depths of 200 ft bgs.

12.3.2 ***Compliance With SCGs.***

Alternative 1 does not comply with any SCGs with the exception of the Federal and state requirement to include a "no action" alternative in the range of detailed evaluation. Alternatives 2 and 3 will not quickly or actively achieve site SCGs. Alternatives 4A, 4B, 5A, and 5B comply with SCGs that relate to groundwater criteria. These four alternatives apply active remediation to "hot spot" areas of groundwater contamination and rely on natural attenuation to assist in achieving remedial objectives. Alternatives 6A, 6B, 7A, and 7B comply with SCGs that relate to groundwater criteria. These alternatives use active treatment across the aerial extent of the off-site groundwater contamination and target NYS Class GA standards to the depths designated in each alternative. Thus, implementation of either Alternative 4A, 4B, 5A, 5B, 6A, 6B, 7A, or 7B would achieve compliance of groundwater SCGs. However, Alternatives 6A, 6B, 7A, and 7B, which address greater extents of the groundwater contamination with active treatment, would likely meet remedial objectives in shorter timeframes than the other alternatives. In addition, it is assumed that any air emissions from an active treatment system will also comply with relevant SCGs.

As noted, Alternatives 6A, 6B, 7A, and 7B achieve the NYS Class GA standards to the designated alternative depths. Alternatives 7A and 7B address the largest quantity of the contaminated off-site groundwater as they remediate the upper and deep portions of the aquifer to a depth of 200 ft bgs.

12.3.3 ***Reduction of Toxicity, Mobility, and Volume Through Treatment.***

Alternatives 1, 2, and 3 will allow natural processes to dissipate the contaminants, but will not create any reduction of toxicity, mobility, or volume of contamination present in the off-site groundwater, as no active remedial measures are included. It should be noted that after yearly technical evaluations of groundwater data and remedial options in Alternative 3, active groundwater treatment (i.e., Alternative 5A) may be established. Alternatives 4A, 4B, 5A, and 5B would result in a permanent decrease in the concentration, mobility, and volume of contaminants present in captured groundwater. However, only "hot spot" areas are addressed with active treatment in these four alternatives. Alternatives 6A, 6B, 7A, and

7B would result in a permanent decrease in the concentration, mobility, and volume of contaminants present in captured groundwater. Class GA standards are achieved at the designated treatment depths via active remediation under each of these four alternatives.

Alternatives 4A, 4B, 6A, and 6B address only the upper portion of the aquifer (i.e., off-site groundwater contamination to a depth of 125 ft bgs). For the in-well vapor stripping and pump and treat scenarios, reductions in toxicity, mobility, and volume of VOCs would be the greatest under Alternatives 7A and 7B (i.e., treatment of the off-site groundwater contaminants to depths of 200 ft bgs).

12.3.4 ***Short-Term Effectiveness.***

Alternatives 1, 2, and 3 result in the least amount of short-term impacts to human health and the environment as the only site activities included (in Alternatives 2 and 3) are monitoring well installation and sampling. Alternatives 4A, 4B, 5A, 5B, 6A, 6B, 7A, and 7B would cause short-term disruptions to the surrounding community due to construction of the remedial components. Alternatives 4A, 4B, 6A, and 6B are likely to have shorter project lives than Alternatives 5A, 5B, 7A, and 7B, respectively, due to the fact that only the upper portion of the aquifer is addressed. Alternatives 4A, 4B, 6A, and 6B are also considered to have less short-term impacts than Alternatives 5A, 5B, 7A, and 7B, respectively, as smaller quantities of system components (e.g., treatment wells, subsurface piping) are generally required.

In addition, higher efficiencies in VOC removal are typically achieved with in-well vapor stripping as compared to groundwater extraction/air stripping. Thus, Alternatives 4A, 5A, 6A, and 7A are anticipated to have shorter project lives than Alternatives 4B, 5B, 6B, and 7B, respectively. The potential hazards to workers implementing the remedy and the surrounding public due to implementation of these alternatives is expected to be minor for the active treatment alternatives. Some noise and traffic would be expected during the brief period of construction of Alternatives 4A, 4B, 5A, 5B, 6A, 6B, 7A, and 7B, with the least amount of disruption anticipated under Alternative 4A.

The scenarios under the in-well vapor stripping alternatives would have less short-term impacts than the respective pump and treat alternatives, as system control and vapor treatment are established at subsurface vaults located next to each well head, and there is no requirement for a large treatment building or extensive lengths of trenching. In the pump and treat alternatives, single central treatment buildings (of about 3,200 sf in Alternatives 4B and 5B, and 4,000 ft^2 in Alternatives 6B and 7B) and trenching for pipelines (ranging from about 3700 to 10,300 l.f., depending on the scenario) are proposed.

12.3.5 ***Long-Term Effectiveness and Permanence.***

Alternatives 4A, 4B, 5A, and 5B permanently remove captured VOC contaminants from the groundwater medium through active remedial processes. However, only "hot spot" areas of groundwater contamination are addressed and natural attenuation is relied upon to help achieve remedial objectives. Alternatives 6A, 6B, 7A, and 7B also permanently remove captured VOC contaminants from the groundwater medium through active remedial processes. The aerial extent of off-site groundwater contamination is addressed with active treatment in these scenarios, and Class GA standards are achieved to the depths designated for each Alternative. Alternatives 1, 2 and 3 do not provide high degrees of long-term effectiveness or permanence as no active remediation measures are proposed. However, it should be noted that a technical analysis of data and remedial options will be made after year 5 in Alternative 3. Alternative 2 (estimated timeframe of 30 years, but possibly longer) may reduce VOC groundwater contamination through in-situ natural attenuation, a passive remedy. Implementation of Alternative 4A, 4B, 5A, 5B, 6A, 6B, 7A, or 7B (all active remedies) is expected to provide a degree of long-term effectiveness and permanence, with implementation of Alternative 7A or 7B (remediation of upper and deep portions of the aquifer to Class GA standards with active treatment) expected to provide the highest degree of long-term effectiveness and permanence.

The estimated timeframes for operating the in-well vapor stripping and pump and treat systems vary between each of the eight alternatives presented, as described in Chapter 11 and Table 12-1. The long-term effectiveness of these alternatives will be optimized by assessing aquifer characteristics, appropriate design of the systems, and the rate of chemical reaction and desorption of the VOC contaminants from aquifer soil particles as required prior to treatment. The estimated remediation timeframes for the in-well vapor stripping and pump and treat alternatives are as follows:

In-Well Vapor Stripping:

- Alternative 4A: 7 years of active remediation plus 13 additional years of natural attenuation (20 year total alternative life).

- Alternative 5A: 9 years of active remediation plus 11 additional years of natural attenuation (20 year total alternative life).
- Alternative 6A: 5 years of active remediation (20 year total alternative life, including long-term groundwater monitoring program).
- Alternative 7A: 7 years of active remediation (20 year total alternative life, including long-term groundwater monitoring program).

<u>Groundwater Extraction/Air Stripping:</u>

- Alternative 4B: 9 years of active remediation plus 11 additional years of natural attenuation (20 year total alternative life).
- Alternative 5B: 12 years of active remediation plus 8 additional years of natural attenuation (20 year total alternative life).
- Alternative 6B: 7 years of active remediation (20 year total alternative life, including long-term groundwater monitoring program).
- Alternative 7B: 10 years of active remediation (20 year total alternative life, including long-term groundwater monitoring program).

The actual timeframes for the active remedies may be longer if the existing subsurface conditions prove to be less than ideal. Aquifer pump tests and/or pilot tests may lead to better estimates of the required remedial timeframes.

12.3.6 *Implementability.*

All eleven alternatives are readily implementable. Alternative 1 is the easiest of the alternatives to implement (No Further Action). Alternative 2 involves monitoring well installation, a site characterization program, establishment of institutional measures, and long-term MNA monitoring. Alternative 3 is also straightforward, as only the construction of monitoring wells, establishment of institutional measures, and a long-term monitoring program are required. Alternatives 4A, 5A, 6A, and 7A involve the installation of in-well vapor stripping wells and a vapor treatment system. It should be noted that in-well vapor stripping is a relatively new, innovative technology for groundwater remediation and has not been as widely demonstrated as the pump and treat technology. The in-well vapor stripping technology is licensed to a small number of vendors and requires specialized experience to implement. Treatment wells and vaults can be located in streets or rights-of-way, and little or no land acquisition is required. Alternatives 4B, 5B, 6B, and 7B include the installation of a groundwater extraction and treatment system, which is a commonly applied technology at inactive hazardous waste sites. Under each of these four pump and treat scenarios, land would need to be acquired for the installation of a central treatment building (3,200 - 4,000 ft^2) and wet wells for effluent re-injection.

12.3.7 ***Cost.***

The costs of each remedial alternative are summarized in Table 12-1. Alternative 1, the no further action alternative, has the lowest estimated present worth ($1.5 million) of the remedial alternatives. Alternative 3, Monitoring, Assessment, and Contingent Remediation, has an estimated cost of $2.2 million. Monitored Natural Attenuation, Alternative 2, has an estimated cost of $2.4 million.

Alternative 4A (remediation of upper portion of aquifer [to 125 ft bgs] with in-well vapor stripping) has an estimated present worth cost of $2.8 million. Alternative 5A (remediation of upper and deep portions of aquifer [to 200 ft bgs] with in-well vapor stripping) was found to have the fifth lowest estimated present worth cost $3.6 million). Alternative 6A (full plume remediation of upper portion of aquifer [to 125 ft bgs] with in-well vapor stripping, $3.7 million) and Alternative 7A (full plume remediation of upper and deep portions of aquifer [to 200 ft bgs] with in-well vapor stripping, $4.9 million) had the sixth and seventh lowest estimated present worth costs, respectively. Alternative 4B (remediation of upper portion of the aquifer [to 125 ft bgs] with groundwater extraction/air stripping) was found to be the least expensive pump and treat alternative (eight least expensive overall), at an estimated present worth cost of about $5.0 million. Pump and treat alternatives 5B (remediation of upper and deep portions of the aquifer [to 200 ft bgs]) and 6B (full plume remediation of upper portion of aquifer [to 125 ft bgs]) were next in estimated costs at $5.3 million and $7.1 million, respectively. Alternative 7B (full plume remediation of upper and deep portion of aquifer [to 200 ft bgs] with groundwater extraction/air stripping) was found to be the most expensive FS alternative, with an estimated present worth cost of $8.2 million.

For each active treatment technology, the systems that address the upper and deep portions of the aquifer were found to be more costly than the corresponding systems that address only the upper portion of the aquifer. An analysis of the two active treatment technologies conducted for this FS found that for in-well vapor stripping, the local treatment alternatives were typically less expensive and easier to implement than comparative central treatment alternatives. Conversely, for the pump and treat alternatives, the central treatment systems were less costly and easier to implement than comparative local treatment scenarios. Appendix L summarizes these findings.

Individual alternative cost tables for the active remedies are included in Tables 12-5 through 12-12. Land acquisition costs that will likely be associated with the groundwater extraction/air stripping alternatives are not included in the cost estimates within this FS. All of the alternatives include O&M costs associated with the treatment of VOCs at the Bowling Green Water District for the duration of the alternative life (i.e., 20 - 30 years). Table 12-13 summarizes the operation and maintenance costs associated with the Bowling Green VOC treatment processes for each alternative. This present worth costs ranges from about $1.0 million (for 20-year alternatives) to $1.5 million for Alternatives 1, 2, and 3 (30 year project lives).

TABLE 12-13

SUMMARY OF O & M COSTS for BOWLING GREEN WATER DISTRICT VOC REMOVAL PROCESSES

NCIA Off-Site Groundwater

Alternative	Project Life (years)	Associated O&M Cost for VOC Treatment Processes[1]
1. No Further Action	30	$1.48 million
2. Monitored Natural Attenuation	30	$1.48 million
3. Monitoring, Assessment, and Contingent Remediation	30	$1.48 million
4A. In-well Vapor Stripping (to 125 ft bgs)	20	$1.03 million
4B. Pump & Treat (to 125 ft bgs)	20	$1.03 million
5A. In-well Vapor Stripping (to 200 ft bgs)	20	$1.03 million
5B. Pump & Treat (to 200 ft bgs)	20	$1.03 million
6A. In-well Vapor Stripping (to 125 ft bgs) (full plume remediation)	20	$1.03 million
6B. Pump & Treat (to 125 ft bgs) (full plume remediation)	20	$1.03 million
7A. In-well Vapor Stripping (to 200 ft bgs) (full plume remediation)	20	$1.03 million
7B. Pump & Treat (to 200 ft bgs) (full plume remediation)	20	$1.03 million

1 Present worth cost based on alternative project life and 5% discount rate.

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NEW YORK STATE SUPERFUND CONTRACT

New Cassel Industrial Area
Offsite Groundwater
Town of North Hempstead, Nassau County

Remedial Investigation/ Feasibility Study (RI/FS) Report

Volume III • Appendices A-L

Work Assignment No. D002676-42.1

September 2000

Prepared for:

New York State
Department of
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R2-0000690

APPENDIX A

BORING / WELL LOGS

LMS Test Boring Log

Project Name: NCIA Monitoring Wells	Boring No.: MW-1
Client: NYSDEC	Sheet 1 of 2
Driller: Delta	Project No.: 650-422
Drilling Method: 4.25" HSA	Date: Start 4-5-99
Boring Location: 2360 Salisbury @ Salisbury and Washington	Finish 4-6-99
Coordinates:	Total Depth:
Logged By: SGE	Depth To Water:
Monitoring Instrument(s): PID	Surf. Elevation:
	Hole Diameter:

Classification Of Material: f - fine, m - medium, c - coarse; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%

Depth (ft)	Blows On Sampler 0"-6"	6"-12"	12"-18"	18"-24"	Recovery (ft)	Instrument Reading	Sample Retained		Classification Of Material	Remarks
0									tan-orange poorly sorted sand and small gravel little med. gravel	
5										
5	9	18	21	25	1.2	2 3	N	dry	0-0.1 wash 0.1-1.2 tan-orange gravel (m/c) and poorly sorted sand (quartz gravel and sand)	Split spoon 5-7'
10										
10	5	6	12	12	0.9	0 1.5	N	dry	0-0.1 wash 0.1-0.9 tan-orange poorly sorted sand and sm.-med. gravel tr. coarse gravel (qtz.)	Split spoon 10-12'
15										
15	6	6	7	6	0.7	0.5 1.0	N	dry	0-0.5 tan-orange poorly sorted sand Fe staining more prominent some sm. gravel 0.5-0.7 fine sand tan less gravel (tr.)	Split spoon 15-17'
20										
20	4	8	6	5	1.0	0 0 0	N	dry	0.0-1.0 tan-orange poorly sorted sand some sm. gravel tr. med. gravel	Split spoon 20-22'
25										
25	5	6	6	9	1.3	0 0.7	N	dry	0.0-1.3 tan-orange poorly sorted sand and f-m gravel	Split spoon 25-27'
30										
30	5	6	7	6	0.9	0 0 0	N	dry	0.0-0.9 tan w/some orange f-m sand some sm. gravel little med. gravel	Split spoon @ 30-32'
35										

R2-0000692

LMS Test Boring Log

Boring No.: MW-1
Sheet 2 of 2
Project No.: 650-422

Depth (ft)	Blows On Sampler 0"-6"	6"-12"	12"-18"	18"-24"	Recovery (ft)	Instrument Reading	Sample Retained		Classification Of Material (f - fine, m - medium, c - coarse; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%)	Remarks
35	8	8	9	10	1.0	2 2	N	dry	0-0.2 poorly sorted orange-tan sand some sm. gravel 0.2-0.3 coarse qtz. gravel 0.3-1.0 well sorted tan fine sand tr. med sand No gravel	much finer than previous samples
40										
40	16	21	33	45	1.4	1.0 1.0 2.0	N	dry	0.0-0.3 wash 0.3-1.4 tan - light orange poorly sorted sand and f-c gravel (qtz.)	Coarse gravel water @ 45
45										
45	12	14	16	19	0	N/A	N	–	N/R @ 45-47' hit water @ 45'	No recovery check DTW before drilling on 4-6-99
50										
50	12	14	16	24	1.4	0 0 0	Y	wet	0.0-1.4 tan-orange sand fining downward thru sample tr. gravel (sm.) in upper 0.3'	40.9' bgs split spoon 50-52'
55										
55	10	12	14	21	1.6	0 0 0	N		0.0-1.6 tan-orange f-m sand little coarse sand tr. gravel (sm.) tr. silt	split spoon 55-57'
60										
60	12	12	18	32	1.8	N/A	Y		0.0-1.8 tan and lt. orange f-c sand No gravel tr. silt	split spoon 60-62'
65										
65	10	11	10	15	1.8	N/A	N		0.0-1.8 tan - lt. brown f. sand little med. sand tr. silt micaceous	split spoon 65-67'
70										
70	15	14	18	38	2.0				0.0-2.0 tan micaceous f. sand and silt tr. med. sand tr. clay	
75										

LMS Test Boring Log

Project Name: NCIA Monitoring Wells	Boring No.: MW-2
Client: NYSDEC	Sheet 1 of 2
Driller: Delta Well and Pump	Project No.: 650-422
Drilling Method: 4.25" HSA	Date: Start 4-7-99
Boring Location: 1018 Bowling Green	Finish 4-8-99
Coordinates:	Total Depth:
Logged By: SGE	Depth To Water:
Monitoring Instrument(s): HNU NYSDEC PID stopped working	Surf. Elevation:
	Hole Diameter:

Depth (ft)	Blows On Sampler 0"-6"	6"-12"	12"-18"	18"-24"	Recovery (ft)	Instrument Reading	Sample Retained		Classification Of Material (f - fine, m - medium, c - coarse; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%)	Remarks
0					~~1.0~~ SGE		~~Y~~ SGE			
5										
5					1.0	0	Y	dry	0.0-0.2 wash from above 0.2-1.0 tan-orange poorly sorted sand and sm. gravel tr. med. gravel	Split spoon 5-7' HNU reading from bag sample
10					~~1.~~					
10					1.6	0	Y	dry	0.0-1.0 orange f. sand some m.-c. sand little sm. gravel tr. med. gravel	Split spoon 10-12' HNU reading from bag sample
15										
15					0.8	0	Y	dry	0.0-0.8 orange poorly sorted sand and sm. gravel	Split spoon 15-20' HNU reading from bag sample
20										
20					0.7	0	Y	dry	0.0-0.7 tan-lt. orange poorly sorted sand some sm.-med gravel tr. c gravel	Split spoon 20-22' HNU reading from bag sample
25										
25					0.7	0	Y	dry	0.0-0.7 tan-orange poorly sorted sand little f-m gravel tr. c gravel	Split spoon 25-27' HNU reading from bag sample
30										
30					1.3	0 0 0	N	dry	0.0-1.3 tan-lt. orange m-c sand little f-c gravel	Split spoon 30-32'
35										
35					0.9	0 0 0	N	dry	0.0-0.9 tan-lt. orange poorly sorted sand some f-m qtz. gravel little c gravel	Split spoon 35-37'
40										

R2-0000694

LMS Test Boring Log

Boring No.: MW-2
Sheet 2 of 2
Project No.: 650-4212

Depth (ft)	Blows On Sampler 0"-6"	6"-12"	12"-18"	18"-24"	Recovery (ft)	Instrument Reading	Sample Retained		Classification Of Material (f - fine, m - medium, c - coarse; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%)	Remarks
40					1.5	0	Y	dry	0.0-1.5 orange f. sand well sorted no gravel	split spoon 40-42'
						0				
						0				
45										
45					1.7	0	N	wet	0.0-1.7 orange f. sand tr. m-c sand tr. f gravel	split spoon 45-47' water @ 45'
						0				
						0				
50										
50					1.8	0	Y	wet	0.0-1.8 lt. orange f. sand tr. m-c sand tr. f gravel	split spoon 50-52'
						0				
						0				
55										
55					0	N/A	N		No Recovery	
60										
60					0	N/A	N		No Recovery	
65										
65					1.6	0	Y	wet	0.0-1.6 tan f. sand well sorted no gravel	split spoon 65-67'
						0				
						0				
70										
70					0	N/A	N		No recovery	
75										

LMS Test Boring Log	
Project Name: NCIA Monitoring Well	Boring No.: MW-3
Client: NYSDEC	Sheet 1 of 2
Driller: Delta	Project No.: 650-422
Drilling Method: 4.25 in HSA	Date: Start 4-8-99
Boring Location: 967 Merillon Ave	Finish 4-9-99
Coordinates:	Total Depth:
Logged By: SGE	Depth To Water:
Monitoring Instrument(s): HNU	Surf. Elevation:
	Hole Diameter:

Depth (ft)	Blows On Sampler 0"-6"	6"-12"	12"-18"	18"-24"	Recovery (ft)	Instrument Reading	Sample Retained		Classification Of Material (f - fine, m - medium, c - coarse; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%)	Remarks
0					0.8	0 0 0	N	dry	0.0-0.1 wash 0.1-0.8 tan-orange poorly sorted sand; little f gravel tr. m gravel	
5										
5	5	8	10	12						Split spoon 5-7 ft
10										
10	5	6	6	10	0.9	0 0 0	N	dry	0.0-0.1 wash 0.1-0.9 tan-orange poorly sorted sand some f-m gravel	split spoon 10-12'
15										
15	3	3	4	4	0.7	0.5 0.5 0.5	N	dry	0.0-0.7 tan-orange poorly sorted sand and f-m gravel	Split spoon 15-17'
20										
20	6	8	8	11	0.4	0 0	N	dry	0.0-0.4 tan - lt. orange f-m sand some f-m gravel little c gravel	Split spoon 20-22' Poor recovery due to large piece of gravel
25										
25	8	8	12	14	1.0	0 0 0	N	dry	0-0.2 wash 0.2-0.3 tan-orange poorly sorted sand tr f-m gravel 0.3-0.4 orange wellsorted f. sand 0.4-1.0 tan f-m sand some f. gravel little c sand	split spoon 25-27'
30										
30	10	12	14	25	0.4	0 0	Y	dry	0.0-0.4 tan-orange poorly sorted sand and f gravel little m-c gravel FeO hardpan	split spoon 30-32' recovery poor due to large piece of gravel
35										
35	25	28	30	42	0.9	0 0	Y	dry	0.0-0.9 f-c qtz. gravel little f-c sand	pulverized gravel from sampling
40										

981 2255

LMS Test Boring Log

Boring No.: MW-3
Sheet 1 of 2
Project No.: 650-424

Depth (ft)	Blows On Sampler 0"-6"	6"-12"	12"-18"	18"-24"	Recovery (ft)	Instrument Reading	Sample Retained		Classification Of Material (f - fine, m - medium, c - coarse; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%)	Remarks
40	8	10	12	12	1.5	0	N	wet	0.0-1.5 orange f-m sand little c sand tr f gravel	Split spoon 40-42' Water @ 40'
						0				
						0				
45										
45	10	11	11	15	0.7	0	N	wet	0.0-0.7 tan-lt. orange f-m sand little c sand tr. f gravel little silt	split spoon @ 45-47'
						0				
						0				
50										
50	16	15	17	18	1.4	0	N	wet	0.0-1.4 tan-lt. orange f sand little med. sand little silt	Split spoon 50-52' spoon fell so much of sample may be wash
						0				
55										
55	15	15	18	19	1.4	0	N	wet	0.0-1.4 tan f sand some m. sand little c. sand	split spoon 55-57'
						0				
						0				
60										
60	16	19	19	21	1.8	0	N	wet	0.0-1.8 tan f. sand tr. silt	Split spoon 60-62
						0				
						0				
65										
65	8	12	14	14	0	N/A	N		No Recovery	No recovery 65-67 spoon
70										
70	10	11	10	16	1.2		N	wet	0.0-1.2 tan f-m sand little c. sand	Split spoon 70-72'
75										

R2-0000697

LMS Test Boring Log

Project Name: NYSDEC NCEA Monitoring Wells	Boring No.: MW-4
Client: NYSDEC	Sheet 1 of 2
Driller: Delta	Project No.: 650-421
Drilling Method: 4.25" HSA	Date: Start 4-12-99 Finish 4-13-99
Boring Location: 1145 Roxbury	Total Depth:
Coordinates:	Depth To Water:
Logged By: SCC	Surf. Elevation:
Monitoring Instrument(s): HNU	Hole Diameter:

Depth (ft)	Blows On Sampler 0"-6"	6"-12"	12"-18"	18"-24"	Recovery (ft)	Instrument Reading	Sample Retained	Classification Of Material (f - fine, m - medium, c - coarse; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%)	Remarks
0								tan-orange poorly sorted sands and f-m gravel tr. silt	
5									
5	21	11	11	30	1.0	0 0 0	Y	0.0-0.2 wash; 0.2-1.0 tan-lt. orange poorly sorted sands some f-c gravel (qtz.)	split spoon 5-7'
10									
10	4	11	8	9	0.8	N/A	Y	0.0-0.8 tan-lt. orange f sand some m. sand little c-vc sand little f-m gravel	split spoon 10-12' HNU not working well (Humidity?)
15									
15	6	5	8	10	0.2	N/A	Y	0.0-0.2 orange poorly sorted sand and f-m gravel	Split spoon 15-17'
20									
20	34	45	8	9	0.9	N/A	Y	0.0-0.9 tan-lt. orange f-m sand some c sand little f. gravel	split spoon 20-22'
25									
25	4	4	8	9	0.8	N/A	Y	0.0-0.8 tan poorly sorted sand some f-m gravel tr coarse lignite/gravel	split spoon 25-27'
30									
30	8	10	12	18	1.0	N/A	Y	0.0-1.0 micaceous white-orange f. sand well sorted large piece of qtz. gravel @ top of sample	Split spoon 30-32'
35									
35	10	15	16	20	1.1	N/A	Y	0.0-0.1 large piece of gravel; 0.1-0.3 f. white sand; 0.3-0.4 orange silty f. sand; 0.4-1.1 lt. orange f. sand	Split spoon 35-37'
40									

LMS Test Boring Log

Boring No.: MW-4
Sheet 2 of 2
Project No.: 650-422

Depth (ft)	Blows On Sampler 0"-6"	6"-12"	12"-18"	18"-24"	Recovery (ft)	Instrument Reading	Sample Retained		Classification Of Material (f - fine, m - medium, c - coarse; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%)	Remarks
40	12	12	14	18	1.2	N/A	Y		0.0-1.2 white, tan and lt. orange f. sand little silt tr. ~~[illegible]~~ m-c sand	Split spoon 40-42'
45										
45					1.9	N/A	Y		0.0-0.2 orange wet silty f. sand 0.2-1.9 pink-grey micaceous silty clay DRY	Split spoon 45-47' water @ 45'
50					1.0	N/A	Y		0.0-0.5 pink grey micaceous silty clay DRY 0.5-0.6 lignite/qtz. gravel layer 0.6-1.0 white to tan wet f. sand	Split spoon 50-52'
50										
55										
55					1.6	N/A	Y		0.0-0.4 dry silty clay Brown to pink-grey 0.4-1.6 white, tan f. sand and orange silty f. sand (wet)	Split spoon 55-57'
60										
60					1.8	N/A	Y		0.0-1.0 orange silty f. sand with stringers of grey clay 1.0-1.2 grey clay (dry) 1.2-1.8 wet orange f. silty sand	Split spoon 60-62'
65										
65					1.9	N/A	Y		0.0-1.9 wet lt. orange-orange fine micaceous silty sand	Split spoon 65-67'
70										
70					2.0	N/A	Y		0.0-2.0 interbedded micaceous vf-f sand, silt and clay colors range from tan to FeO brown/red and salmon pink-orange	Split spoon 70-72'
75										

R2-0000699

HYDROPUNCH LOGS

LMS Test Boring Log	**Boring No.:** Myron
	Sheet 1 **of** 2
Project Name: NCIA	**Project No.:** 650-426
Client: NYSDEC	**Date:** Start 1-19-2000
Driller: DELTA WELL AND PUMP	Finish 1-26-2000
Drilling Method: 4.25" ID Hollow Stem Auger	**Total Depth:** 150
Boring Location: Myron Rd, Salisbury	**Depth To Water:** 55
Coordinates:	**Surf. Elevation:**
Logged By: E. HOLLISTER	**Hole Diameter:** 8"
Monitoring Instrument(s): NYSDEC Microtip	

Depth (ft)	Blows On Sampler 0"-6"	6"-12"	12"-18"	18"-24"	Recovery (ft)	Instrument Reading	Sample Retained	Moisture Content	Classification Of Material (f - fine, m - medium, c - coarse; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%)	Remarks
58	3				1.5	0		wet	orange f-c silty sand; trace gravel.	1/20/2000
		3							hp sample 60-62'	B94830 10:30
			4							
60				5						
68	sank				1.9	0		wet	orange f-c silty sand; trace gravel.	B94832 11:25
		sank							hp sample 70-72'	
			5						Fe(II) appx. 5.5	
70				5						B94833 12:30
78	6				1.5	0		wet	tan/orange f-m silty sand; trace c sand,	
		5							gravel.	
			7						hp sample 80-82'	1/20/2000
80				7					Fe(II) appx. 6 (too turbid)	1/21/2000
88	6				1.6	0		wet		B94835 11:00
		8							tan/orange f-m silty sand; trace c sand,	bd 948341/20
			8						gravel.	13:30 and
90				9					hp sample 90-92' Fe(II) 2.4	MS/MSD
100	10				1.5	0		wet		
		11							tan/orange f-m silty sand; trace clay, c	B94836 12:45
			12						sand, gravel.	(taken before split
102				15					hp sample 98-100'	spoon)
110	4				1.4	0.1		wet		
		6							tan f silty sand;trace clay	B94838 13:45
			7						black flakes - biotite?	
112				9					Fe(II) appx. 2.5 (turbid) 108-110	
120	3				2	0.1				B94837 14:40
		5							tan f silty sand;trace clay	
			7						black flakes - biotite? (clay in augers,	
122				9					just above spoon) HP 118-120	1/24 B94840
130	3				2	1.3				10:30 PID bkgd
		4							tan grading to orange silty f sand,	1.0
			4						micaceous;trace m-c sand;thin lenses	
132				5					gray clay from 1.1-1.5 and 1.7-1.8.	
140	3				1.5	0			Fe(II) appx. 4.0 128-130	B94841 12:20
		7								
			7						tan f silty sand; trace clay, m sand.	
142				8					Fe(II) 4.5 138-140	

LMS Test Boring Log

Boring No.: Myron
Sheet 2 of 2
Project No.: 650-426

Classification Of Material

f - fine
m - medium
c - coarse

and - 35-50%
some - 20-35%
little - 10-20%
trace - 0-10%

Depth (ft)	Blows On Sampler 0"-6"	6"-12"	12"-18"	18"-24"	Recovery (ft)	Instrument Reading	Moisture Content		Classification Of Material	Remarks
150	3				0.8	1.1	wet		dk gray f-m silty sand; little clay.	PID bkgd 0.9
		5								
			7							B94842 14:15
152				7					Fe(II) appx. 3.5 (turbid) 148-150	

LMS Test Boring Log	Boring No.: Basin #51
	Sheet 1 of 2
Project Name: NCIA	**Project No.:** 650-426
Client: NYSDEC	**Date:** Start 1/27/2000
Driller: DELTA WELL ANDPUMP	Finish 2/2/2000
Drilling Method: 4.25" ID Hollow Stem Auger	**Total Depth:** 150
Boring Location: Basin #51	**Depth To Water:** 55
Coordinates:	**Surf. Elevation:**
Logged By: E. HOLLISTER	**Hole Diameter:** 8"
Monitoring Instrument(s): NYSDEC Microtip	

Depth (ft)	Blows On Sampler 0"-6"	6"-12"	12"-18"	18"-24"	Recovery (ft)	Instrument Reading	Moisture Content	PID background	Classification Of Material (f - fine, m - medium, c - coarse; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%)	Remarks
60	116				1.4	0.5	wet	0.5	Fe(II) 0.5 58-60 0-0.5 slough - tan silty clayey f sand 0.5-0.85 red/brown silty f-m sand, few iron-rich nodules. 0.85-1.5 tan silty clayey f sand; trace f gray clay layers.	B94843 TB-7 1/28 B94844 10:00
		31								
			70							
62				97			moist			
72	9				1.3	0.8	wet	0.8	Fe(II) water too turbid 70-72 Tan silty f sand; little clay; trace m-c sand, gravel (some iron-rich)	B94845 13:00
		10								
			7							
74				7						
80	12				1.1	1		0.9	Fe(II) 0.7 78-80' orange-tan silty f sand; trace gray clay, gravel.	B94846 !4:30 1/31/2000 PID not working
		18								
			13							
82				10						
90	3				2	-	moist	-	variegated gray, orange, and pink clay, silty clay, and silty, clayey vf-f sand. Fe(II) 0.9 94-96'	B94847 94-96' 10:40
		6								
			8							
92				12						
102	6				0.6	-	wet	-	Fe(II) 1.8 100-102' silty f-c sand; little f gravel.	B94848 11:40
		9								
			11							
104				14						B94849 13:00
110	2				1.5	3.6	wet	2.5	Fe(II) 108-110' too turbid tan silty vf-m sand grading to m-c sand; some gravel.	
		2								
			4							
112				5						B94850 14:05
120					2	1.4	wet	0.9	Fe(II) 118-120' too turbid lt. brown f-m silty sand; trace gray clay.	
			6							
122				8						B94851 15:30
130	na				2	0	wet	0	Fe(II) 128-130' too turbid lt. brown f-m silty sand; trace gray clay.	
		6								2/1/2000
			6							B94852 09:05
132				8						
140	na				1.8	0	wet	0	Fe(II) 138-140' 0.5 lt. brown f-m silty sand (trace gray clay) grading to lt. brown f-m silty sand and iron-rich gravel.	
		na								
			na							
142				na						

LMS Test Boring Log

Boring No.: Basin #51
Sheet 2 of 2
Project No.: 650-426

Depth (ft)	Blows On Sampler 0"-6"	6"-12"	12"-18"	18"-24"	Recovery (ft)	Instrument Reading	Moisture Content	PID background	Classification Of Material (f - fine, m - medium, c - coarse; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%)	Remarks
150	na				1.5	0	wet	0	lt. Brown and orange silty f-m sand;	
		na							little gravel, gray clay.	2/1/2000
			na						Fe(II) 0.2 148-150.	B94853
152				na						

LMS Test Boring Log

Project Name: NCIA	**Boring No.:** Fieldston
	Sheet 1 of 2
Client: NYSDEC	**Project No.:** 650-426
Driller: Delta Well & Pump	**Date:** Start 2/3/2000
	Finish 2/8/2000
Drilling Method: 4.25" ID Hollow Stem Auger	**Total Depth:** 150 ft.
Boring Location: Fieldston	**Depth To Water:** 55
Coordinates:	**Surf. Elevation:**
Logged By: E. Hollister	**Hole Diameter:** 8"
Monitoring Instrument(s): NYSDEC Microtip	

Depth (ft)	Blows On Sampler 0"-6"	6"-12"	12"-18"	18"-24"	Recovery (ft)	Instrument Reading	Moisture Content	PID background	Classification Of Material (f - fine, m - medium, c - coarse; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%)	Remarks
60	3				1.5	6.2	wet	5.4	Fe(II) 58-60 2.9	2/3/2000
	*	6							tan silty f-m sand; trace gravel - some	B94855 11:30
			9						iron-rich;trace orange mottling.	
62				11						
70	3				1.4	0	wet	0	Fe(II) 68-70 4.0	B94856 13:00
	*	4							tan silty f-m sand; trace gravel.	MS/MSD
			5							BD B94858 16:00
72				7						
80	na				1.3	0	wet	0	Fe(II) 78-80 4.5	B94857 14:30
	*	na							tan silty f-m sand; trace gravel.	
			na							
82				na						2/4/2000
90	5				1	0	wet	0	Fe(II) 88-90 2.5	B94859 09:30
	*	6							tan silty vf-m sand grading to f-c sand;	
			8						some gravel;trace clay.	
92				10						
100	na				0.9	2.1	wet	1.4	Fe(II) 98-100 3.5	B94860 10:30
		na							variegated tan and orange silty f-m	PID acting up
			na						sand;trace clay.	
102				na						
110	2				1.5	0	wet	0	Fe(II) 108-110 3.4	B94861 11:30
	*	5							tan, trace orange silty f-m sand; trace	
			10						gravel, clay.	
112				15						
120	5				2	0	wet	0	Fe(II) 118-120 appx. 4.5 turbid	B94862 12:30
	*	5							tan silty f-c sand.	
			7							
122				10						
130	na				1.9	0	wet	0	Fe(II) 128-130 too turbid	B94863 13:45
		na							variegated tan and orange silty f-m	
			na						sand;trace clay.	2/7/2000
132				na						B94864 TB-9
140	na									B94865 0940
		na							Fe(II) 138-140 apprx. 3.5	
			na						tan f-m snad, little silt (slough)	
142				na						

LMS Test Boring Log

Boring No.: Fieldston
Sheet 2 of 2
Project No.: 650-426

Depth (ft)	Blows On Sampler 0"-6"	6"-12"	12"-18"	18"-24"	Recovery (ft)	Instrument Reading	Moisture Content	PID background	Classification Of Material (f - fine, m - medium, c - coarse; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%)	Remarks
150	na								Fe(II) 148-150 apprx. 6.0 (very turbid)	
		na							tan f-m sand, little silt	
			na							
152				na						
									* not standard blow counts (6' drop used)	

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R2-0000706

LMS Test Boring Log	**Boring No.:** Salisbury
	Sheet 1 of 2
Project Name: NCIA	**Project No.:** 650-426
Client: NYSDEC	**Date:** Start 2/9/2000
Driller: Delta Well and Pump	Finish 2/14/2000
Drilling Method: 4.25" ID Hollow Stem Auger	**Total Depth:**
Boring Location: Salisbury Rd, Salisbury	**Depth To Water:**
Coordinates:	**Surf. Elevation:**
Logged By: E. Hollister	**Hole Diameter:** 8"
Monitoring Instrument(s): NYSDEC Microtip	

Depth (ft)	Blows On Sampler 0"-6"	6"-12"	12"-18"	18"-24"	Recovery (ft)	Instrument Reading	Moisture Content	PID background	Classification Of Material (f - fine, m - medium, c - coarse; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%)	Remarks
60	3				0.5	2.7	wet	2.7	Fe(II) 58-60 2.0	2/9/2000
	*	5							tan silty f-m sand; trace clay. possibly	B94867 TB-10
			8						slough.	B94868 0830
62				10						
70	3				0.5	-	wet	-	Fe(II) 68-70 too turbid	B94869 0940
	*	6							tan silty f-m sand; trace clay. possibly	PID not working
			8						slough.	B94870 1000
72				10						equipment rinse
80	7				2	0	wet	0	Fe(II) 78-80 5.2	B94871 1100
	*	10							tan and orange variegated silty fine	
			14						sand; trace clay; trace gray clay.	
82				16					(top portion slough)	
90	4				2	0	wet	0	Fe(II) 88-90 very turbid!	B94872 1200
	*	6							marbled tan (slough?) and dark gray	
			10						silty f sand; little clay.	
92				16					No HP sample 98-100	No HP sample 98-
100	na				0.5	0	wet	0	clayey, silty vf-f sand, tan with dark	100
	*	na							gray; trace orange clay. probably	
			na						mixture with slough.	
102				na						
110	3				2	1	wet	1.7	Fe(II) 108-110 too turbid	B94873 1600
	*	5							tan silty f sand - may be some of the	
			7						heaving sands coming in the augers.	
112				10						2/10/2000
120	3				2	-	wet	-	Fe(II) 118-120 3.5	PID Dead
	*	7							tan silty vf-f micaceous (muscovite)	B94874 1015
			10						sand; trace clay.	B94876 1430 roll-
122				13						off
130	skipped					-		-	lots of heaving sands, switched to	
	*								adding mud. no samples this depth.	
										2/11/2000
132										PID not working
140	8				1.5	-	wet	-		B94875 1120
		12							Fe(II) 138-140 2.5	B94877 TB-11
			16						mixture of tan and brown and orange	
142				20					silty vf-f sand, little clay with slough-	
									gray mud from drilling.	

LMS Test Boring Log

Boring No.:Salisbury
Sheet 2 of 2
Project No.: 650-426

Classification Of Material: f - fine, m - medium, c - coarse; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%

Depth (ft)	Blows On Sampler 0"-6"	6"-12"	12"-18"	18"-24"	Recovery (ft)	Instrument Reading	Moisture Content	PID background	Classification Of Material	Remarks
150	15				1.9	-	wet	-	Fe(II) 148-150 2.4	B94878 1300
		21							marbled tan, orange, gray, and white	
			36						silty vf-f sand; little clay.	
152				41						
									(white vf beach sands...)	
									* not standard blow counts (6' drop used)	

Table A-1

Fe^{2+} in Hydropunch Samples

depth interv	Myron	Basin #51	Fieldston	Salisbury
60		0.5	2.9	2.0
70	5.5		4.0	
80	6.0	0.7	4.5	5.2
90	2.4	0.9	2.5	tt
100		1.8	3.5	na
110	2.5		3.4	
120			4.5	3.5
130	4.0			
140	4.5	0.5	3.5	
150	3.5	0.2	6.0	

Table A-2

Hydropunch Sample List

NYSDEC ID	location	depth	date	time	comments	SDG #
B94830	Myron	60-62	20-Jan	10:30		0120
B94831		TB-5	20-Jan	-		0120
B94832	Myron	70-72	20-Jan	11:25		0120
B94833	Myron	80-82	20-Jan	12:30		0120
B94834	Myron	BD of 90-92	20-Jan	13:30	actually1-21	0120
B94835	Myron	90-92	21-Jan	11:00	MS, MSD	0120
B94836	Myron	98-100	21-Jan	12:45		0120
B94837	Myron	118-120	21-Jan	14:40		0120
B94838	Myron	108-110	21-Jan	13:45		0120
B94839		TB-6	24-Jan	-		0120
B94840	Myron	128-130	24-Jan	10:30		0120
B94841	Myron	138-140	24-Jan	12:20		0120
B94842	Myron	148-150	24-Jan	14:15		0120
B94843		TB-7	28-Jan	-		0128
B94844	Basin # 51	58-60	28-Jan	10:00		0128
B94845	Basin # 51	70-72	28-Jan	13:00		0128
B94846	Basin # 51	78-80	28-Jan	14:30		0128
B94847	Basin # 51	94-96	31-Jan	10:40		0128
B94848	Basin # 51	100-102	31-Jan	11:40		0128
B94849	Basin # 51	108-110	31-Jan	13:00		0128
B94850	Basin # 51	118-120	31-Jan	14:05		0128
B94851	Basin # 51	128-130	31-Jan	15:30		0128
B94852	Basin # 51	138-140	1-Feb	9:05		0128
B94853	Basin # 51	148-150	1-Feb	10:30		0128
B94854		TB-8	3-Feb	-		0128
B94855	Fieldston	58-60	3-Feb	11:30		0128
B94856	Fieldston	68-70	3-Feb	13:00	MS/MSD	
B94857	Fieldston	78-80	3-Feb	14:30		0128
B94858	Fieldston	BD of 68-70	3-Feb	16:00		0128
B94859	Fieldston	88-90	4-Feb	9:30		0128
B94860	Fieldston	98-100	4-Feb	10:30		0128
B94861	Fieldston	108-110	4-Feb	11:30		0128
B94862	Fieldston	118-120	4-Feb	12:30		0128
B94863	Fieldston	128-130	4-Feb	13:45		0128
B94864	Fieldston	TB-9	7-Feb	-		0128
B94865	Fieldston	138-140	7-Feb	9:40		0128
B94866	Fieldston	148-150	7-Feb	10:45		0128
B94867		TB-10	9-Feb	-		0128
B94868	Salisbury	58-60	9-Feb	8:30		0128
B94869	Salisbury	68-70	9-Feb	9:40		0128
B94870	Salisbury	eq. Rinse	9-Feb	10:00		0128
B94871	Salisbury	78-80	9-Feb	11:00		0128
B94872	Salisbury	88-90	9-Feb	12:00		0128
skipped	Salisbury	98-100	9-Feb	skipped		0128
B94873	Salisbury	108-110	9-Feb	16:00		0128
B94874	Salisbury	118-120	10-Feb	10:15		0128
B94875	Salisbury	138-140	11-Feb	11:20		0128
B94876		roll-off	10-Feb	14:30		0128
B94877		TB-11	11-Feb	-		0128
B94878	Salisbury	148-150	11-Feb	13:00		0128

Total number of samples = 39

MONITORING WELL COMPLETION LOGS

MONITORING WELL COMPLETION LOG

PROJECT NUMBER: 650-424

PROJECT NAME: NCIA Residential Monitoring Wells

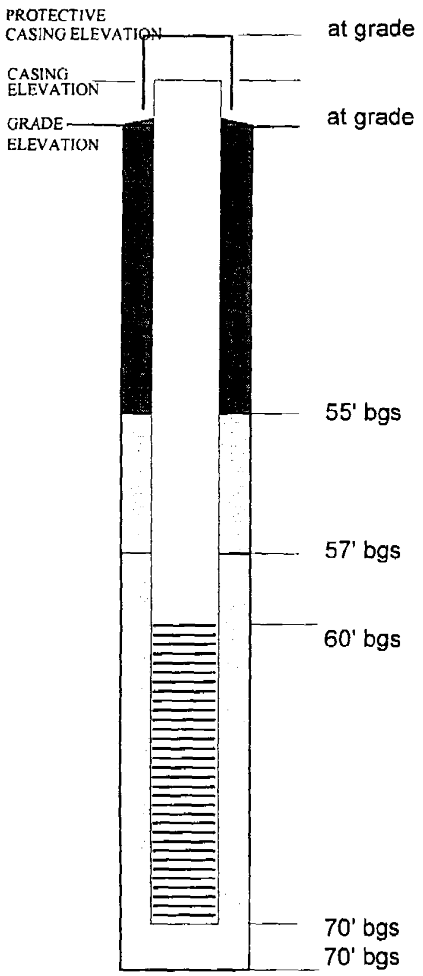
WELL No.: NRMW-1

CLIENT: NYSDEC

LOCATION: 2360 Salisbury Road

DATE DRILLED:	DATE DEVELOPED:	WELL CONSTRUCTION COMPLETED:
4/5-6/1999	15-Apr-99	6-Apr-99

DEVELOPING METHOD: Pump and Surge (using 2" submersible pump)



NOT TO SCALE

INSPECTOR: Scott G. Englert

DRILLING CONTRACTOR: Delta Well & Pump

TYPE OF WELL: overburden

STATIC WATER LEVEL: 40.6 DATE: 4/15/99

MEASURING POINT: top of riser TOTAL DEPTH OF WELL: 70' TOTAL DEPTH OF BORING: 70'

DRILLING METHOD

TYPE: HSA

DIAMETER: 4.25 "

CASING:

SAMPLING METHOD

TYPE: 2 ft. split spoon

DIAMETER: 2 in. WEIGHT: 140 lb.

FALL: 2 ft. INTERVAL: 5 ft.

RISER PIPE LEFT IN PLACE

MATERIAL: Sch 40 PVC

DIAMETER: 2 " LENGTH: 60 ' JOINT TYPE: flush

SCREEN

MATERIAL: Sch 40 PVC

INTERVAL: 60-70' DIAMETER: 2"

STRATIGRAPHIC UNITS SCREENED: UGA SLOT SIZE: 10

FILTER PACK

GRADE: Morie #1

SAND: GRAVEL: NATURAL:

AMOUNT: 2 bags INTERVAL: 57-70'

SEAL(s)

NOTES:

	INTERVAL:	AMOUNT:
Portland Cement		
Bentonite Slurry	55-57'	20 lbs. 30-35 gal.
Bentonite Pellets		
Other: Cement/bentonite grout	0-55'	10 bags cement 20 lbs. bentonite

LOCKING CASING: X YES ☐ NO KEY NO: 2144

LMS LAWLER, MATUSKY & SKELLY ENGINEERS LLP

R2-0000712

MONITORING WELL COMPLETION LOG

PROJECT NUMBER: 650-424

PROJECT NAME: NCIA Residential Monitoring Wells

WELL No.: NRMW-2

CLIENT: NYSDEC

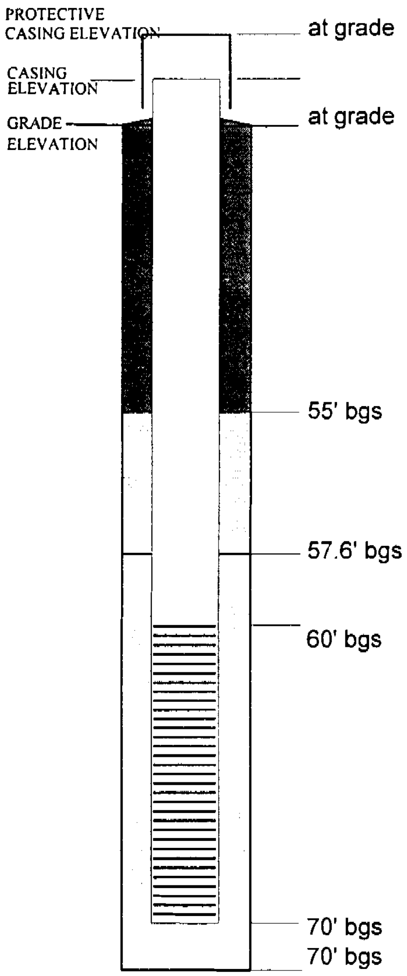
LOCATION: 1018 Bowling Green Drive

DATE DRILLED: 7-Apr-99

DATE DEVELOPED: 15-Apr-99

WELL CONSTRUCTION COMPLETED: 8-Apr-99

DEVELOPING METHOD: Pump and Surge (using 2" submersible pump)



NOT TO SCALE

INSPECTOR: Scott G. Englert

DRILLING CONTRACTOR: Delta Well & Pump

TYPE OF WELL: overburden

STATIC WATER LEVEL: 44.45 DATE: 4/15/99

MEASURING POINT: top of riser TOTAL DEPTH OF WELL: 70' TOTAL DEPTH OF BORING: 70'

DRILLING METHOD

TYPE: HSA

DIAMETER: 4.25 "

CASING:

SAMPLING METHOD

TYPE: 2 ft. split spoon

DIAMETER: 2 in.

WEIGHT: 140 lb.

FALL: 2 ft.

INTERVAL: 5 ft.

RISER PIPE LEFT IN PLACE

MATERIAL: Sch 40 PVC

DIAMETER: 2 " LENGTH: 60 ' JOINT TYPE: flush

SCREEN

MATERIAL: Sch 40 PVC

INTERVAL: 60-70' DIAMETER: 2"

STRATIGRAPHIC UNITS SCREENED: UGA SLOT SIZE: 10

FILTER PACK

GRADE: Morie #1

SAND: GRAVEL: NATURAL:

AMOUNT: 2 bags INTERVAL: 57.6-70 '

SEAL(s)

	INTERVAL:	AMOUNT:
Portland Cement		
Bentonite Slurry	55-57.6'	20 lbs. 30-35 gal.
Bentonite Pellets		
Other: Cement/bentonite grout	10-55'	10 bags cement 20 lbs. bentonite

NOTES:

grouted to 10' below grade
remainder backfilled with sand
to provide drainage

LOCKING CASING: [X] YES [ ] NO KEY NO: 2144

LMS LAWLER, MATUSKY & SKELLY ENGINEERS LLP

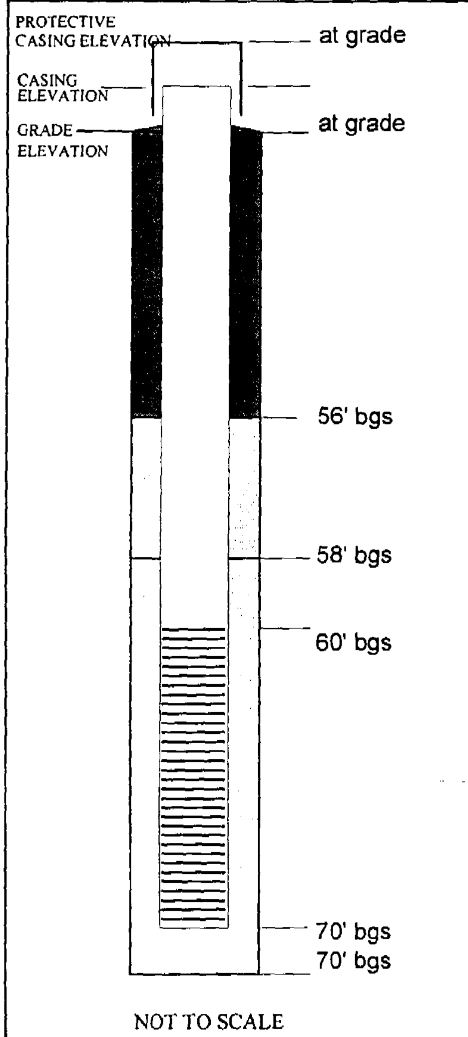
R2-0000713

MONITORING WELL COMPLETION LOG

PROJECT NUMBER: 650-424	WELL No.: NRMW-3
PROJECT NAME: NCIA Residential Monitoring Wells	
CLIENT: NYSDEC	
LOCATION: 967 Merillon Avenue	

DATE DRILLED:	DATE DEVELOPED:	WELL CONSTRUCTION COMPLETED:
4/8-9/1999	15-Apr-99	9-Apr-99

DEVELOPING METHOD: Pump and Surge (using 2" submersible pump)



INSPECTOR: Scott G. Englert

DRILLING CONTRACTOR: Delta Well & Pump

TYPE OF WELL: overburden

STATIC WATER LEVEL: 40.2 DATE: 4/15/99

MEASURING POINT: top of riser TOTAL DEPTH OF WELL: 70' TOTAL DEPTH OF BORING: 70'

DRILLING METHOD

TYPE: HSA

DIAMETER: 4.25 "

CASING:

SAMPLING METHOD

TYPE: 2 ft. split spoon

DIAMETER: 2 in. WEIGHT: 140 lb.

FALL: 2 ft. INTERVAL: 5 ft.

RISER PIPE LEFT IN PLACE

MATERIAL: Sch 40 PVC

DIAMETER: 2 " LENGTH: 60 ' JOINT TYPE: flush

SCREEN

MATERIAL: Sch 40 PVC

INTERVAL: 60-70' DIAMETER: 2"

STRATIGRAPHIC UNITS SCREENED: UGA SLOT SIZE: 10

FILTER PACK

GRADE: Morie #1

SAND: GRAVEL: NATURAL:

AMOUNT: 2 bags INTERVAL: 58-70 '

SEAL(s)

	INTERVAL:	AMOUNT:
Portland Cement		
Bentonite Slurry	56-58'	20 lbs. 30-35 gal.
Bentonite Pellets		
Other: Cement/bentonite grout	10-56'	10 bags cement 20 lbs. bentonite

NOTES:

grouted to 10' below grade
remainder backfilled with sand
to provide drainage

LOCKING CASING: [X] YES [ ] NO KEY NO: 2144

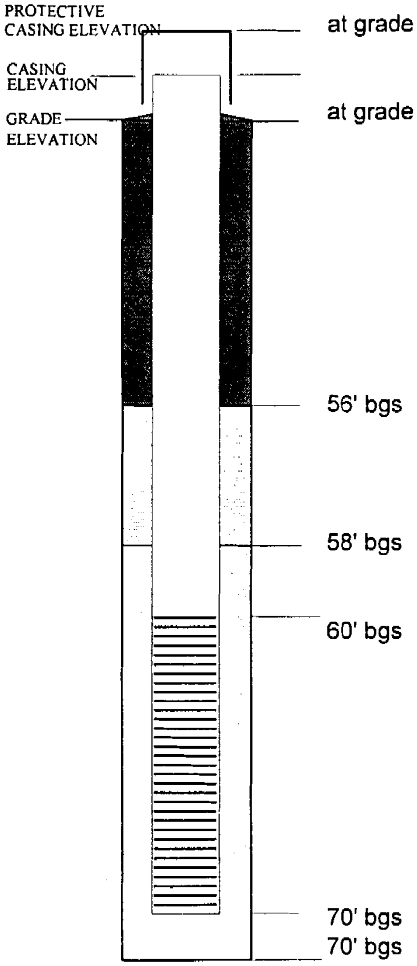
LMS LAWLER, MATUSKY & SKELLY ENGINEERS LLP

MONITORING WELL COMPLETION LOG

PROJECT NUMBER: 650-424	WELL No.: NRMW-4
PROJECT NAME: NCIA Residential Monitoring Wells	
CLIENT: NYSDEC	
LOCATION: 1145 Roxbury Drive	

DATE DRILLED:	DATE DEVELOPED:	WELL CONSTRUCTION COMPLETED:
12-Apr-99	15-Apr-99	13-Apr-99

DEVELOPING METHOD: Pump and Surge (using 2" submersible pump)



NOT TO SCALE

INSPECTOR: Scott G. Englert

DRILLING CONTRACTOR: Delta Well & Pump

TYPE OF WELL: overburden

STATIC WATER LEVEL: 42.25 DATE: 4/15/99

MEASURING POINT: top of riser TOTAL DEPTH OF WELL: 70' TOTAL DEPTH OF BORING: 70'

DRILLING METHOD

TYPE: HSA

DIAMETER: 4.25 "

CASING:

SAMPLING METHOD

TYPE: 2 ft. split spoon

DIAMETER: 2 in. WEIGHT: 140 lb.

FALL: 2 ft. INTERVAL: 5 ft.

RISER PIPE LEFT IN PLACE

MATERIAL: Sch 40 PVC

DIAMETER: 2 " LENGTH: 60 ' JOINT TYPE: flush

SCREEN

MATERIAL: Sch 40 PVC

INTERVAL: 60-70' DIAMETER: 2"

STRATIGRAPHIC UNITS SCREENED: UGA SLOT SIZE: 10

FILTER PACK

GRADE: Morie #1

SAND: GRAVEL: NATURAL:

AMOUNT: 2 bags INTERVAL: 58-70'

SEAL(s)

	INTERVAL:	AMOUNT:
Portland Cement		
Bentonite Slurry	56-58'	20 lbs. 30-35 gal.
Bentonite Pellets		
Other: Cement/bentonite grout	10-56'	4 bags cement 20 lbs. bentonite

NOTES:

grouted to 10' below grade
remainder backfilled with sand
to provide drainage

LOCKING CASING: ☒ YES ☐ NO KEY NO: 2144

LMS LAWLER, MATUSKY & SKELLY ENGINEERS LLP

4/21/99 12:43 PM EH Inns1.xlsMW Completion Log

R2-0000715

APPENDIX B

WELL DEVELOPMENT LOGS

MONITORING WELL DEVELOPMENT LOGS

LMS Well Development Log

Well #: NRMW-1
Date Started: 15-Apr-99 **Start SWL:** 40.6 **Developed By:** Delta Well & Pump
Date Finished: 15-Apr-99 **Finish SWL:** 40.7 **Method:** 2" submersible pump and surge

Meters
pH: **Conductivity:**
Temp: **Turb.:**

Time	pH	Temp	Conductivity	Turb.	Est. Purged Vol.	Comments
825	5.9	14.9	0.161	>200	0	water is milky orange in color
835	5.3	14.7	0.151	33	25	flow rate = 2.5 gpm
845	5.3	15.3	0.15	28	50	parameters taken after surging
855	5.2	15.2	0.149	>200	75	parameters taken after surging
905	5.1	15.1	0.153	8	100	
915	5.2	16.1	0.156	11	125	parameters taken after surging

Note:
Temperature is measured in Celsius
Conductivity values in millimhos/cm
Turbidity is measured in NTU
Volume is measured in gallons

+Disk No.: C:\CHUCK\Logs.xls Development 1/21/99 13:28:24+

LMS Well Development Log

Well #: NRMW-4
Date Started: 15-Apr-99
Date Finished: 15-Apr-99

Start SWL: 42.25
Finish SWL: 42.47

Developed By: Delta Well & Pump
Method: 2" submersible pump and surge

Meters

pH:
Temp:
Conductivity:
Turb.:

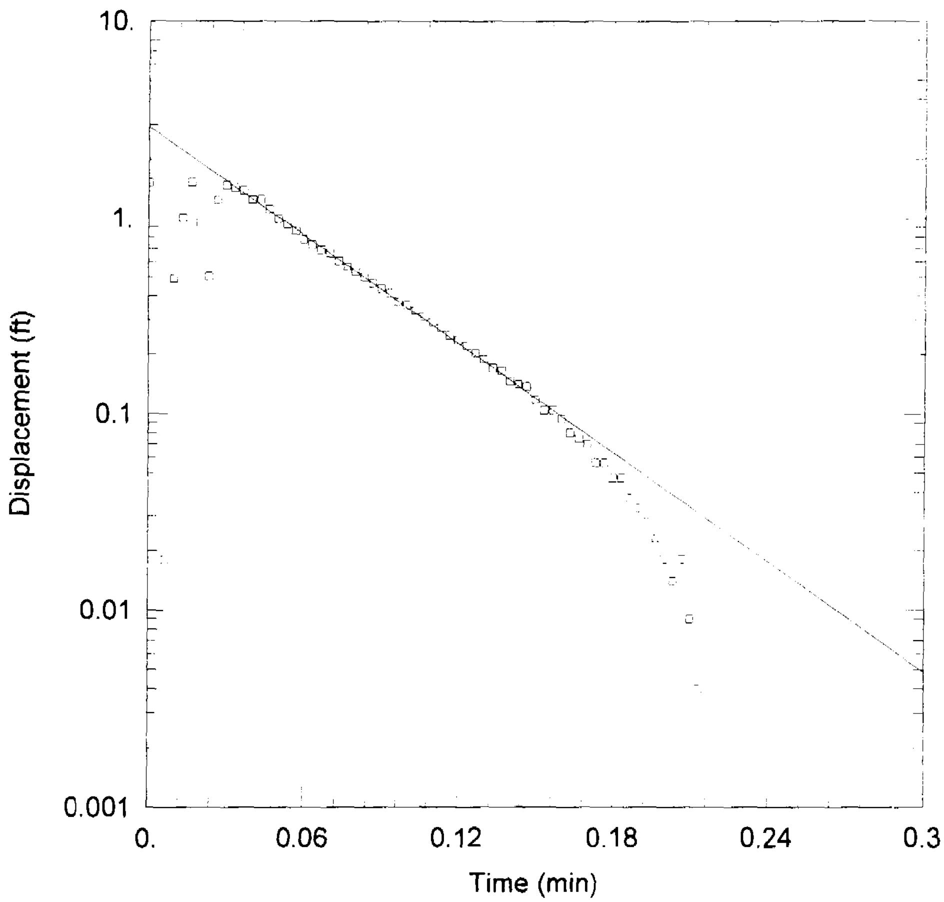
Time	pH	Temp	Conductivity	Turb.	Est. Purged Vol.	Comments
1144	6.6	17.9	0.134	>200	0	pumping rate = 3.5 gpm ; water is milky orange in color initially
1154	6.1	15.7	0.103	100	35	
1204	5.9	15.2	0.099	121	70	parameters taken after surging well
1214	5.9	15.5	0.097	16	105	parameters taken after surging well ; DTW = 45.26
1224	5.9	15.8	0.095	18	140	parameters taken after surging well
1230	5.9	15.6	0.093	17	160	parameters taken after surging well ; water clear within 1 minute after surge

Note:
Temperature is measured in Celsius
Conductivity values in millimhos/cm
Turbidity is measured in NTU
Volume is measured in gallons

+Disk No.: C:\CHUCK\Logs.xls Development 1/21/99 13:28:24+

APPENDIX C

IN-SITU HYDRAULIC TESTING



NRMW-1OUT

Data Set: D:\MYDOCU~1\NCIA\NCIAGW\SLUGTEST\RESULTS\NRMW1OUB.AQT
Date: 03/03/00 Time: 09:10:14

AQUIFER DATA

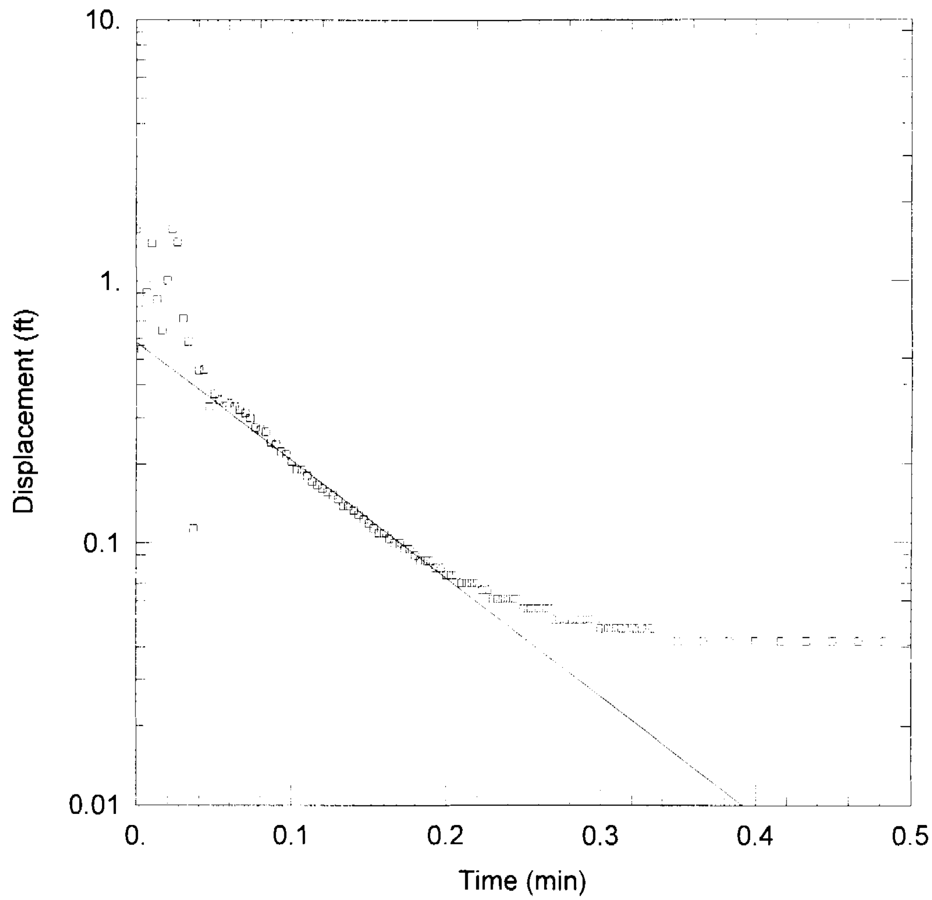
Saturated Thickness: 500. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 1.521 ft
Casing Radius: 0.08333 ft
Screen Length: 10. ft
Water Column Height: 29.13 ft
Wellbore Radius: 0.3333 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 144.1 ft/day
y0 = 2.932 ft



NRMW-1IN

Data Set: D:\MYDOCU~1\NCIA\NCIAGW\SLUGTEST\RESULTS\NRMW1INB.AQT
Date: 03/03/00 Time: 09:09:01

AQUIFER DATA

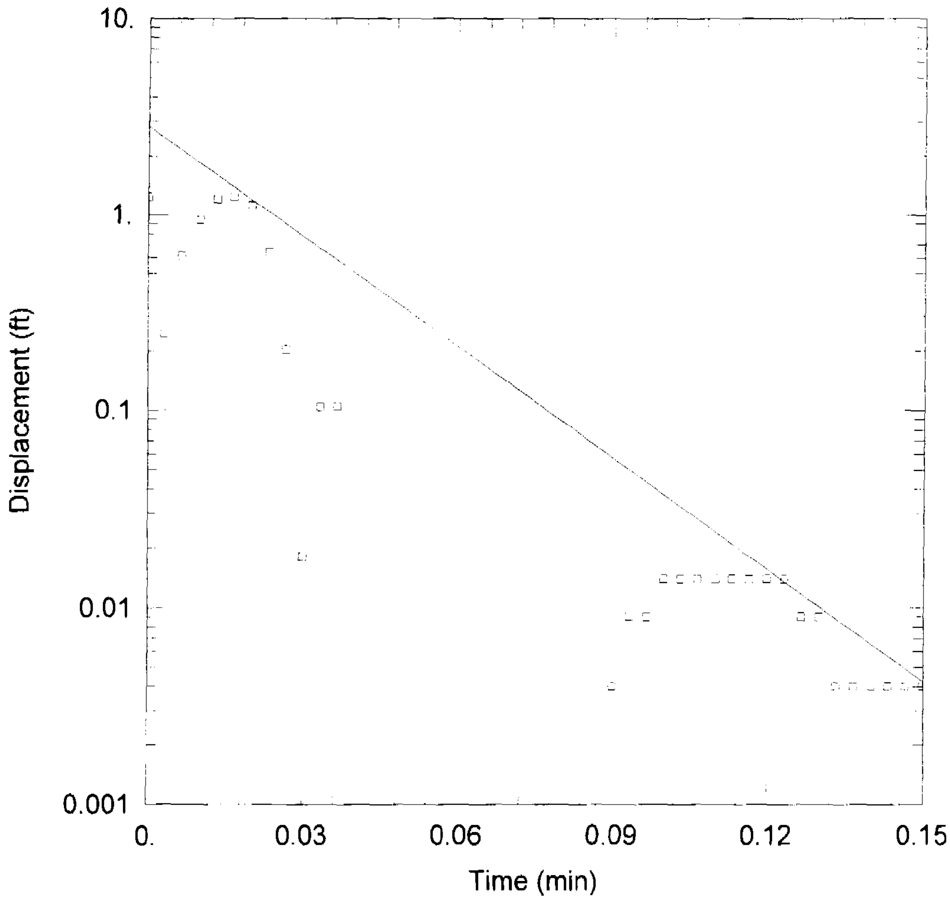
Saturated Thickness: 500. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 1.583 ft Water Column Height: 29.13 ft
Casing Radius: 0.08333 ft Wellbore Radius: 0.3333 ft
Screen Length: 10. ft Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined K = 70.16 ft/day
Solution Method: Bouwer-Rice y0 = 0.5815 ft



NRMW-2BIN

Data Set: D:\MYDOCU~1\NCIA\NCIAGW\SLUGTEST\RESULTS\NRMW2BIN.AQT
Date: 03/03/00 Time: 09:12:05

AQUIFER DATA

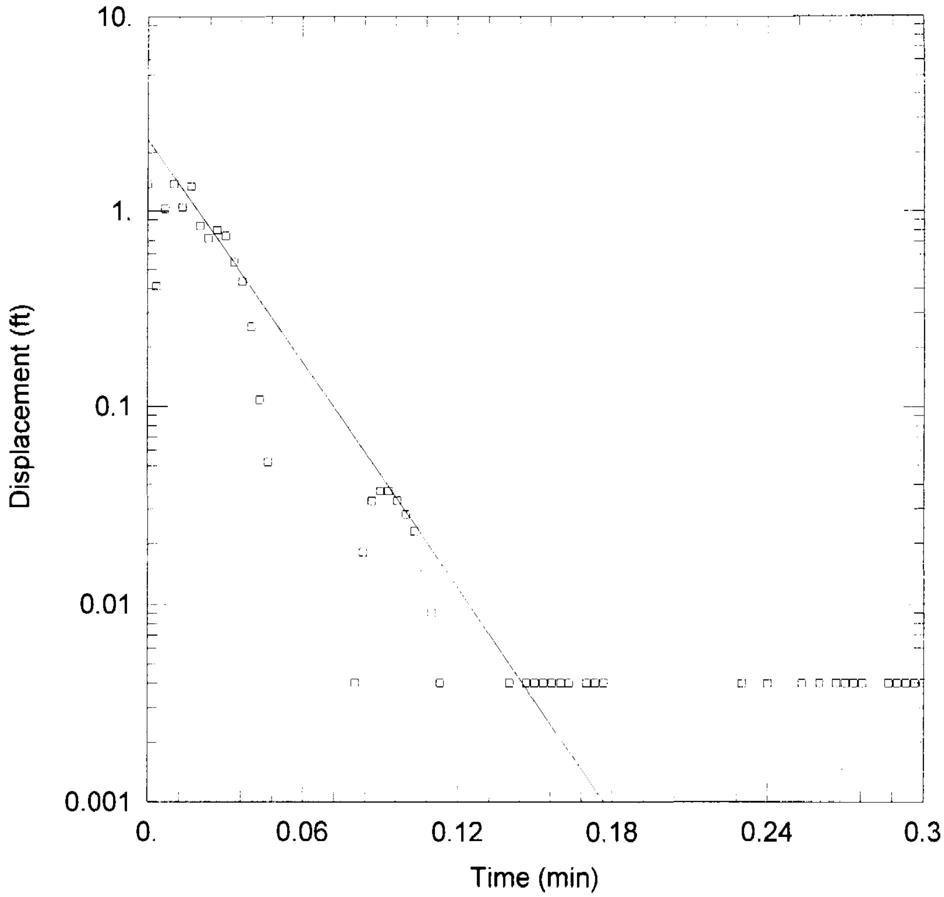
Saturated Thickness: 500. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 1.239 ft Water Column Height: 25.16 ft
Casing Radius: 0.08333 ft Wellbore Radius: 0.3333 ft
Screen Length: 10. ft Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined K = 287.1 ft/day
Solution Method: Bouwer-Rice y0 = 2.84 ft



NRMW-2BOUT

Data Set: D:\MYDOCU~1\NCIA\NCIAGW\SLUGTEST\RESULTS\NRMW2BOU.AQT
Date: 03/03/00 Time: 09:12:42

AQUIFER DATA

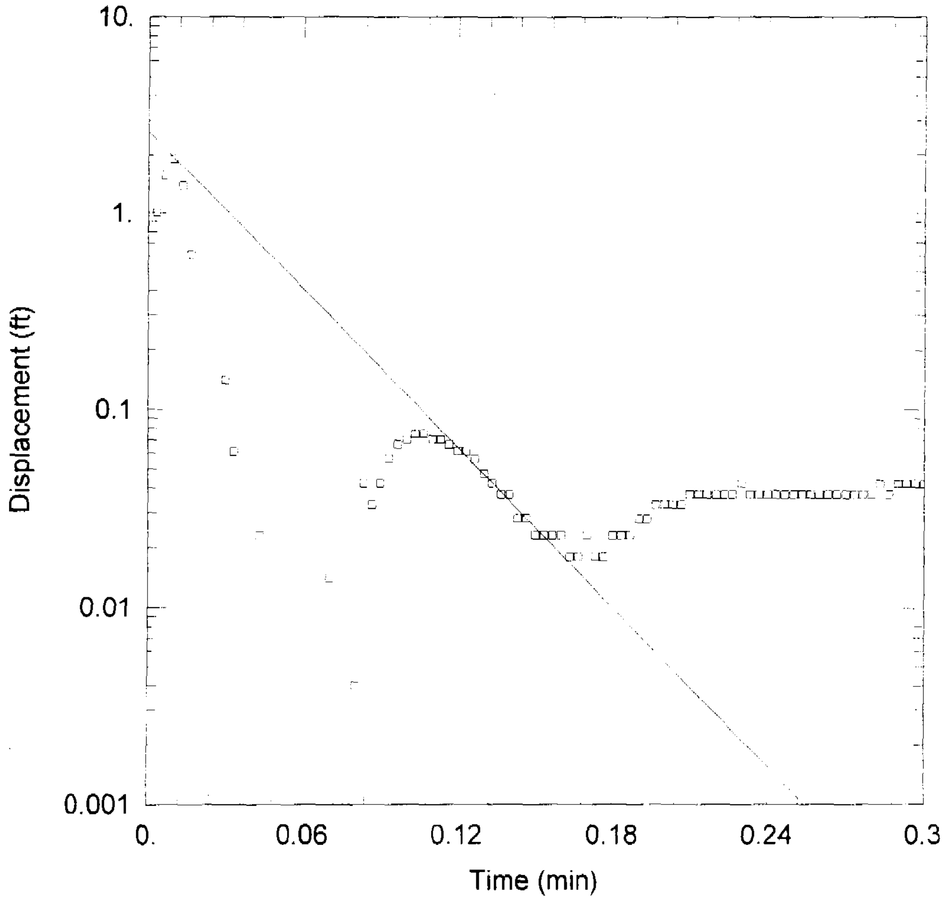
Saturated Thickness: 500. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 1.376 ft Water Column Height: 25.16 ft
Casing Radius: 0.08333 ft Wellbore Radius: 0.3333 ft
Screen Length: 10. ft Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined K = 290.6 ft/day
Solution Method: Bouwer-Rice y0 = 2.332 ft



NRMW-3AIN

Data Set: D:\MYDOCU~1\NCIA\NCIAGW\SLUGTEST\RESULTS\NRMW3AIN.AQT
Date: 03/03/00 Time: 09:13:40

AQUIFER DATA

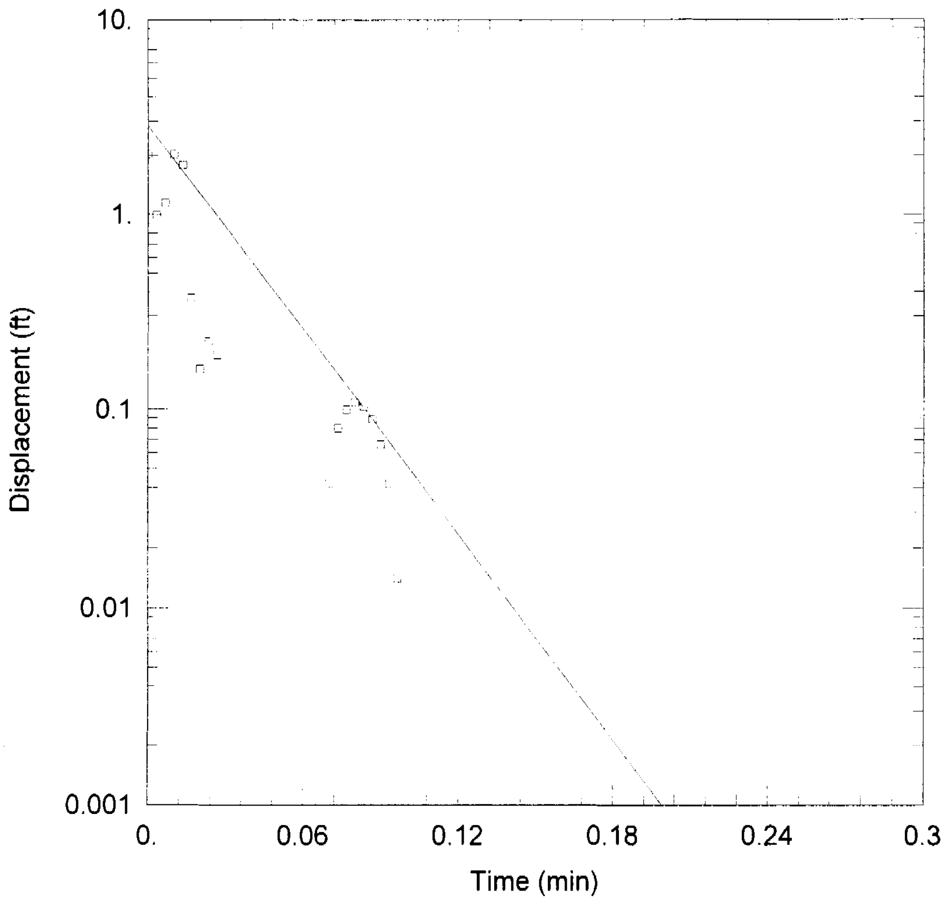
Saturated Thickness: 500. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 1.909 ft
Casing Radius: 0.08333 ft
Screen Length: 10. ft
Water Column Height: 29.59 ft
Wellbore Radius: 0.3333 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 209.7 ft/day
y0 = 2.622 ft



NRMW-3AOUT

Data Set: D:\MYDOCU~1\NCIA\NCIAGW\SLUGTEST\RESULTS\NRMW3AOU.AQT
Date: 03/03/00 Time: 09:14:03

AQUIFER DATA

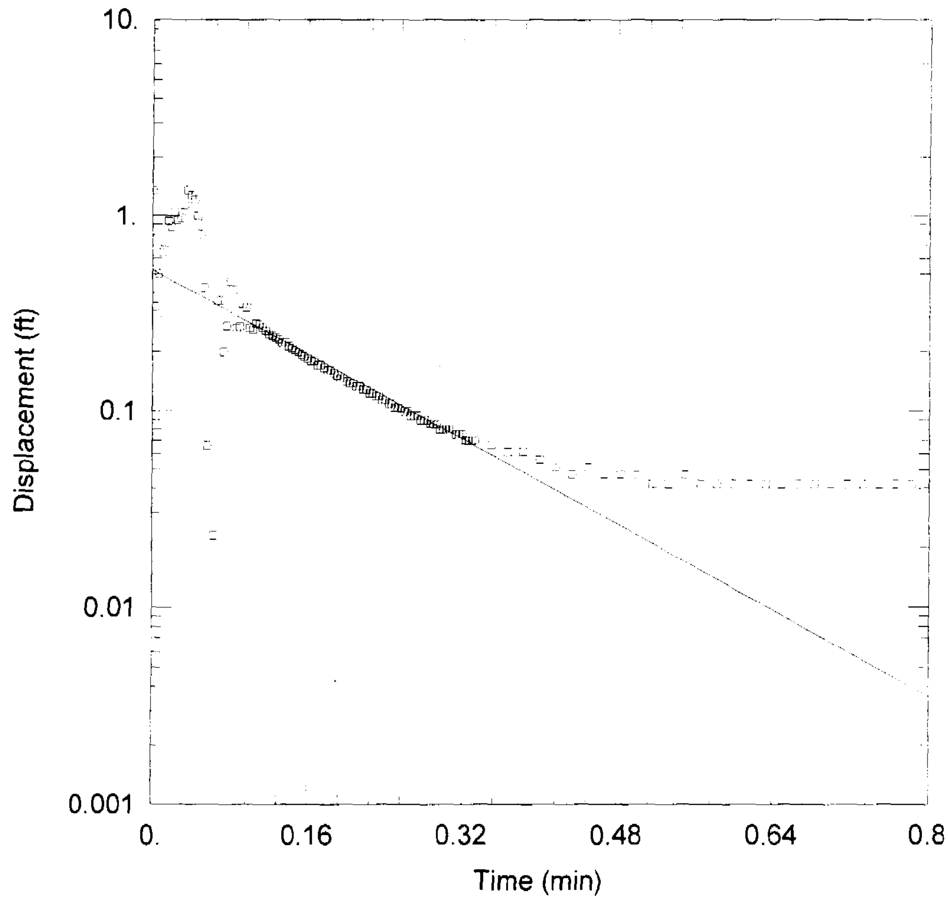
Saturated Thickness: 500. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 2.036 ft
Casing Radius: 0.08333 ft
Screen Length: 10. ft
Water Column Height: 29.59 ft
Wellbore Radius: 0.3333 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 270.6 ft/day
y0 = 2.833 ft



NRMW-4BIN

Data Set: D:\MYDOCU~1\NCIA\NCIAGW\SLUGTEST\RESULTS\NRMW4BIN.AQT
Date: 03/03/00 Time: 09:14:34

AQUIFER DATA

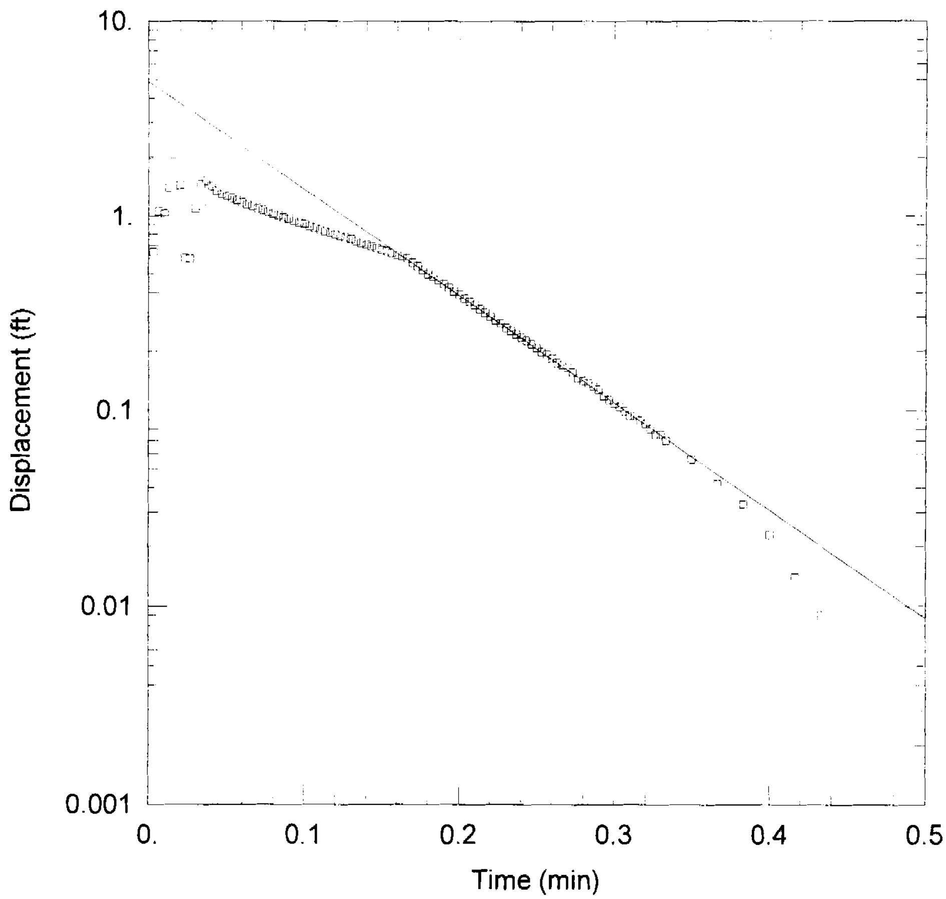
Saturated Thickness: 500. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 1.351 ft
Casing Radius: 0.08333 ft
Screen Length: 10. ft
Water Column Height: 27.57 ft
Wellbore Radius: 0.3333 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 41.79 ft/day
y0 = 0.5236 ft



NRMW-4AOUT

Data Set: D:\MYDOCU~1\NCIA\NCIAGW\SLUGTEST\RESULTS\NRMW4AOU.AQT
Date: 03/03/00 Time: 09:15:13

AQUIFER DATA

Saturated Thickness: 500. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 2.055 ft
Casing Radius: 0.08333 ft
Screen Length: 10. ft
Water Column Height: 27.57 ft
Wellbore Radius: 0.3333 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 84.91 ft/day
y0 = 4.865 ft

APPENDIX D

MONITORING WELL SAMPLING LOGS

MONITORING WELL SAMPLING LOGS
APRIL 1999

LMS Well Sampling Log

Date:	16-Apr	**METERS USED**	
Crew:	CJ DK	Temp.:	TCL #10
Job No:	650-422	pH:	DEC 4-99-02
Project:	NCIA Groundwater	Cond.:	TCL #10
Project Site:		Turb.:	LMS #001

Well ID No.:	EW-1B	DTW Before Sampling:	45.77
Well Condition:	Good	Sample Date/Time:	4/16/99 1240
Well Depth/Diameter:	164/2"	Sampling Method:	Teflon Bailer
Well Casing Type:	PVC sch 80	Sampling Depth(s):	TOW
Screened Interval:	154-164	DTW After Sampling:	45.77
Casing Ht./Lock No.:	none	Chain-of-Custody No.(s):	
Reference Pt.:	TOC	Analytical Lab(s):	H2M
Depth to Water (DTW):	45.77	Sampling Observations:	
Water Column Ht./Vol.:	118'/33		
Purge Est.:	100		
Purge Method(s):	Grundfos 2"		
Purge Date/Time(s):	4/16/1999 1130-		
Depth(s):	150 and up		
Rates (gpm):	3		
Purged Volume:	100		
DTW After Purging:	45.79		
Yield Rate: L - M - H			
Purge Observations:			

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	14.8	5.9	278	90
End	14.8	5.9	279	110

SAMPLE ANALYSES

Parameters	Inv. No.	Pres.	Meth.	Filter
TCL VOC		HCl	95-1	No

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	14.6	5.9	303	7
20	14.7	5.8	291	7
40	14.9	5.7	289	4
60	14.9	5.7	289	9
80	14.9	5.7	290	12
100	15	5.7	289	8

Comments:

Air Temp: 12

Weather Conditions: Cold Rainy

Crew Chief Signature E Hollrith Date: 3/7/00

Note:
Temperature is measured in Celsius
Turbidity is measured in NTU
Volume is measured in gallons

LMS Well Sampling Log

Date: 19-Apr-99
Crew: EH/DK
Job No: 650-422
Project: NCIA Well sampling
Project Site: Early warning well 1 deep

METERS USED

Temp.: TLC#8
pH: DEC 4-99-04
Cond.: TLC#8
Turb.: s/n 19834

Well ID No.: EW-1C
Well Condition: good
Well Depth/Diameter: 516/4
Well Casing Type: carbon steel
Screened Interval: bottom 10
Casing Ht./Lock No.: ~
Reference Pt.: TOC
Depth to Water (DTW): ~
Water Column Ht./Vol.: ~470
Purge Est.: ~1000
Purge Method(s): dedicated grundfos
Purge Date/Time(s): 4-19/ 1630-1755

Depth(s): bottom
Rates (gpm): 15
Purged Volume: >1000
DTW After Purging: ~
Yield Rate: **H**
Purge Observations:

DTW Before Sampling: ~
Sample Date/Time: 4-19/ 1800
Sampling Method: dedicated HDPE tubing
Sampling Depth(s): ~
DTW After Sampling: ~
Chain-of-Custody No.(s):
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C	pH	Sp. Cond	Turb.
Start	11.9	7.6	.108	9.1
End	12	7.6	.109	11.2

SAMPLE ANALYSES

Parameter	Inv. No.	Pres. Meth.	Filter
VOCs	49	<4°C	N

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	14.8	9.9	.141	37.2
200	12.9	9.3	.117	110.2
400	12.4	8.3	.112	79.7
600	12.3	7.8	.110	16.6
800	12.1	7.6	.109	13.4
1000	11.9	7.6	.108	9.1

Comments:

Air Temp: 60's
Weather Conditions: occasional drizzle/sun

Crew Chief Signature E Hollister Date: 3-7-00

LMS Well Sampling Log

Date:	16-Apr
Crew:	CJ DK
Job No:	650-422
Project:	NCIA Groundwater
Project Site:	

METERS USED	
Temp.:	TCL #10
pH:	DEC 4-99-02
Cond.:	TCL #10
Turb.:	LMS #001

Well ID No.:	EW-2B
Well Condition:	Good
Well Depth/Diameter:	142'/2"
Well Casing Type:	PVC sch 80
Screened Interval:	132-142
Casing Ht./Lock No.:	none
Reference Pt.:	TOC
Depth to Water (DTW):	46.7
Water Column Ht./Vol.:	95'/30
Purge Est.:	90
Purge Method(s):	Grundfos 2"
Purge Date/Time(s):	4/16/1999 900- 1055
Depth(s):	All
Rates (gpm):	1.5
Purged Volume:	90
DTW After Purging:	46.7
Yield Rate: L - M - H	M

Purge Observations: Had pump problems ... worked best when pumpingat a slow rate

DTW Before Sampling:	46.7
Sample Date/Time:	4/16/99 - 1100
Sampling Method:	Teflon Bailer
Sampling Depth(s):	TOW
DTW After Sampling:	46.7
Chain-of-Custody No.(s):	
Analytical Lab(s):	H2M
Sampling Observations:	

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	15.1	5.7	265	10
End	15.2	5.7	271	15

SAMPLE ANALYSES

Parameters	Inv. No.	Pres.	Meth.	Filter
TCL VOC		HCl	95-1	No

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	16	5.7	268	100
18	15.1	5.7	266	5
36	15.1	5.7	265	5
54	15.1	5.7	263	4
72	15.1	5.7	264	4
90	15.1	5.7	265	10

Comments:

Air Temp: 12

Weather Conditions: Cold Rainy

Crew Chief Signature E Hollister Date: 3.7.00

Note:
Temperature is measured in Celsius
Turbidity is measured in NTU
Volume is measured in gallons

LMS Well Sampling Log

Date: 20-Apr-99
Crew: EH/DK
Job No: 650-422
Project: NCIA Well Sampling
Project Site: Aster

METERS USED
Temp.: TLC#8
pH: DEC 4-99-04
Cond.: TLC#8
Turb.: SN 19834

Well ID No.: EW-2C
Well Condition: good
Well Depth/Diameter: ~500 4
Well Casing Type: carbon steel
Screened Interval: bottom 10
Casing Ht./Lock No.:
Reference Pt.:
Depth to Water (DTW): ~45
Water Column Ht./Vol.: ~455 ~309
Purge Est.: ~1000
Purge Method(s): dedicated submersible pum
Purge Date/Time(s): 21-Apr-99 0850-1000

Depth(s): all
Rates (gpm): 15
Purged Volume: >1000
DTW After Purging:
Yield Rate: H
Purge Observations:

DTW Before Sampling:
Sample Date/Time: 20-Apr 1000
Sampling Method: dedicated HDPE tubing
Sampling Depth(s): toc
DTW After Sampling:
Chain-of-Custody No.(s):
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C	pH	Sp. Cond	Turb.
Start	12.6	7.5	.054	9
End	12.6	7.5	.054	5

SAMPLE ANALYSES

Parameter	Inv. No.	Pres. Meth.	Filter
VOCs	55	<4°C	N

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	14.7	10.7	.159	19
250	12.5	10.1	.097	15
500	12.5	8.3	.062	>100
750	12.5	7.6	.056	40
1000	12.6	7.5	.054	9

Comments:

Air Temp: 60
Weather Conditions: sunny

E Hollister

Crew Chief Signature

Date: 3-7-00

LMS Well Sampling Log

Date: 12-Apr-99
Crew: EH/BM
Job No: 650-422
Project: NCIA WELL SAMPLING
Project Site: 675 Brooklyn

METERS USED
Temp.: TLC#8
pH: DEC 4-99-04
Cond.: TLC#8
Turb.: NYSDEC Monitek 21 PE SN# L-3324

Well ID No.: N-9938
Well Condition: fair
Well Depth/Diameter: 70.56/4"
Well Casing Type: pvc
Screened Interval: bottom 5 + 3' sump
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 52.96
Water Column Ht./Vol.: 17.6/29.0
Purge Est.: 90
Purge Method(s): grundfos
Purge Date/Time(s): 12-Apr-99 16:30-17:05

Depth(s): all
Rates (gpm): 3
Purged Volume: >90
DTW After Purging: 53.25
Yield Rate: H
Purge Observations:

DTW Before Sampling: 53.25
Sample Date/Time: 4-12/17:10
Sampling Method: teflon bailer
Sampling Depth(s): toc
DTW After Sampling: 52.98
Chain-of-Custody No.(s):
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C	pH	Sp. Cond	Turb.
Start	15.8	5.1	.383	7
End	15.0	5.7	.247	30

SAMPLE ANALYSES

Parameter	Inv. No.	Pres. Meth.	Filter
VOCs	07	<4°C	N

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	15.2	5.5	.419	>100
15	15.8	5.2	.382	10
30	15.4	5.2	.374	10
45	15.4	5.1	.380	10
60	15.8	5.1	.374	10
75	15.2	5.1	.377	15
90	15.8	5.1	.383	7

Comments: turbidity estimated, meter will not calibrate.
well cleared up nicely.

Air Temp: 50's
Weather Conditions: breezy, partly cloudy

Crew Chief Signature E Hollst

Date: 3-7-00

R2-0000735

LMS Well Sampling Log

Date:	12-Apr	**METERS USED**	
Crew:	CJ DK	Temp.:	TLC #10
Job No:	650-422	pH:	DEC 4-99-02
Project:	NCIA Groundwater	Cond.:	TLC #10
Project Site:		Turb.:	LMS #001

Well ID No.:	N-9939	DTW Before Sampling:	40.2
Well Condition:	Good	Sample Date/Time:	4/12/99 - 1055
Well Depth/Diameter:	77'/4in	Sampling Method:	Teflon Bailer
Well Casing Type:	PVC sch 80	Sampling Depth(s):	TOW
Screened Interval:	74-79	DTW After Sampling:	40.2
Casing Ht./Lock No.:	none	Chain-of-Custody No.(s):	
Reference Pt.:	TOC	Analytical Lab(s):	H2M
Depth to Water (DTW):	40.2	Sampling Observations:	
Water Column Ht./Vol.:	39'/31		
Purge Est.:	93		
Purge Method(s):	Grundfos 2"		
Purge Date/Time(s):	4/12/1999 1015- 1040		
Depth(s):	All		
Rates (gpm):	6		
Purged Volume:	95		
DTW After Purging:	40.2		
Yield Rate: L - M - H	H		
Purge Observations:			

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	13.7	4.9	389	5
End	13.7	4.7	381	15

SAMPLE ANALYSES

Parameters	Inv. No.	Pres.	Meth.	Filter
TCL VOC		HCL	95-1	NO

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	13.6	5	384	110
19	13.7	4.8	381	10
38	13.6	5.1	382	10
57	13.8	5.4	382	6
76	13.4	5.3	389	6
95	13.7	4.9	389	5

Comments:

Air Temp: 10.1

Weather Conditions: Sunny

Crew Chief Signature E Hollister Date: 3-7.00

Note:
Temperature is measured in Celsius
Turbidity is measured in NTU
Volume is measured in gallons

LMS Well Sampling Log

Date:	20-Apr-99	METERS USED	
Crew:	EH/DK	Temp.:	TLC#8
Job No:	650-422	pH:	DEC 4-99-04
Project:	NCIA Well Sampling	Cond.:	TLC#8
Project Site:	NY Ave. (Adchem)	Turb.:	SN 19834

Well ID No.:	N-10321	
Well Condition:	fair	
Well Depth/Diameter:	61.2	2
Well Casing Type:		pvc
Screened Interval:		bottom 10
Casing Ht./Lock No.:		
Reference Pt.:	TOC	
Depth to Water (DTW):	52.69	
Water Column Ht./Vol.:	8.51/ 7.6	
Purge Est.:	22.9	
Purge Method(s):	grundfos	
Purge Date/Time(s):	20-Apr-99	1415-1430
Depth(s):	all	
Rates (gpm):	1.5	
Purged Volume:	>24	
DTW After Purging:	52.83	
Yield Rate:	M - H	
Purge Observations:		

DTW Before Sampling:	52.70
Sample Date/Time:	20-Apr 1445
Sampling Method:	teflon bailer
Sampling Depth(s):	toc
DTW After Sampling:	52.7
Chain-of-Custody No.(s):	
Analytical Lab(s):	H2M
Sampling Observations:	

SAMPLE CHEMISTRIES

	Temp. (°C	pH	Sp. Cond	Turb.
Start	15.8	5.3	.215	15
End	14.5	5.5	.218	>100

SAMPLE ANALYSES

Parameter	Inv. No.	Pres. Meth.	Filter
VOCs	53	<4°C	N

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.	
0	15.0	5.6	.264	>200	
6	15.7	5.5	.219	35	
12	15.7	5.5	.211	20	pulled pump 3'
18	15.7	5.2	.215	75	
24	15.8	5.3	.215	15	

Comments:

Air Temp: 50's
Weather Conditions: rain

Crew Chief Signature E Hollst Date: 3-7-00

R2-0000737

LMS Well Sampling Log

Date: 12-Apr-99
Crew: EH/BM
Job No: 650-422
Project: NCIA WELL SAMPLING
Project Site: Bond & Summa

METERS USED

Temp.: TLC#8
pH: DEC 4-99-04
Cond.: TLC#8
Turb.: NYSDEC Monitek 21 PE SN# L-3324

Well ID No.: N-10322
Well Condition: fair
Well Depth/Diameter: 63.5/1.5"
Well Casing Type: pvc
Screened Interval: bottom 10'
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 53.86
Water Column Ht./Vol.: 9.64/8.2
Purge Est.: 25
Purge Method(s): teflon bailer
Purge Date/Time(s): 12-Apr-99 14:15-16:10

Depth(s): all
Rates (gpm): 0.25
Purged Volume: 25
DTW After Purging: 53.89
Yield Rate: L
Purge Observations:

DTW Before Sampling: 53.89
Sample Date/Time: 4-12/16:15
Sampling Method: teflon bailer
Sampling Depth(s): toc
DTW After Sampling: 53.89
Chain-of-Custody No.(s):
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C	pH	Sp. Cond	Turb.
Start	14.6	5.3	.207	>200
End	14.6	5.3	.168	>200

SAMPLE ANALYSES

Parameter	Inv. No.	Pres. Meth.	Filter
VOCs	08	<4°C	N

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0.5	14.6	5.8	.237	>200
5	14.2	5.4	.198	>200
10	14.7	5.5	.202	>200
15	14.4	5.4	.201	>200
20	14.4	5.4	.200	>200
25	14.6	5.3	.207	>200

Comments:
Dark brown, very silty, sandy

Air Temp: 50's
Weather Conditions: breezy, partly cloudy

Crew Chief Signature E Hollister Date: 5-7-00

LMS Well Sampling Log

Date:	15-Apr
Crew:	CJ DK
Job No:	650-422
Project:	NCIA Groundwater
Project Site:	

METERS USED	
Temp.:	TCL #10
pH:	DEC 4-99-02
Cond.:	TCL #10
Turb.:	LMS #001

Well ID No.:	N-10324
Well Condition:	Fair
Well Depth/Diameter:	57'/2"
Well Casing Type:	PVC sch 80
Screened Interval:	47-57
Casing Ht./Lock No.:	none
Reference Pt.:	TOC
Depth to Water (DTW):	47.95
Water Column Ht./Vol.:	9'/12
Purge Est.:	36
Purge Method(s):	Grundfos 2"
Purge Date/Time(s):	4/15/1999
	840- 905
Depth(s):	All
Rates (gpm):	4
Purged Volume:	36
DTW After Purging:	47.95
Yield Rate: L - M - H	H
Purge Observations:	

DTW Before Sampling:	47.95
Sample Date/Time:	4/15/99 - 0910
Sampling Method:	Teflon Bailer
Sampling Depth(s):	TOW
DTW After Sampling:	47.95
Chain-of-Custody No.(s):	
Analytical Lab(s):	H2M
Sampling Observations:	

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	14.8	6.3	324	5
End	14.7	6.4	322	90

SAMPLE ANALYSES

Parameters	Inv. No.	Pres.	Meth.	Filter
TCL VOC		HCl	95-1	No

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	14.4	6.5	416	110
7	14.8	6.4	327	15
14	14.8	6.3	323	7
21	14.8	6.2	324	6
28	14.8	6.2	322	5
36	14.8	6.3	324	5

Comments: Had to drill through pvc cap to open... Need to replace cap

Air Temp: 16
Weather Conditions: Sunny

Crew Chief Signature E Hall Jr   Date: 3-7-00

Note:
Temperature is measured in Celsius
Turbidity is measured in NTU
Volume is measured in gallons

LMS Well Sampling Log

Date: 13-Apr
Crew: BSM / DK
Job No: 650-
Project: NCIA
Project Site: Swalm St

METERS USED
Temp.:
pH:
Cond.:
Turb.:

Well ID No.: N-10325 (NC-8)
Well Condition: Good
Well Depth/Diameter: 57' / 2"
Well Casing Type: PVC
Screened Interval: 10'
Casing Ht./Lock No.: Flush
Reference Pt.: Notch on PVC
Depth to Water (DTW): 49.38'
Water Column Ht./Vol.: 7.62' / ~10 gal
Purge Est.: ~30 gal
Purge Method(s): Grundfos
Purge Date/Time(s): 4/13/99 / 1100

Depth(s): ~55'
Rates (gpm): 3 GPM
Purged Volume: ~30 gal
DTW After Purging: 49.50'
Yield Rate: L - M - H
Purge Observations:

DTW Before Sampling: 49.50'
Sample Date/Time: 4/13/99 / 1145
Sampling Method: Bailer
Sampling Depth(s): ~55'
DTW After Sampling: 49.50'
Chain-of-Custody No.(s):
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	14.8	6.2	0.168	>200
End	14.8	5.9	0.111	>200

SAMPLE ANALYSES

Parameters	Inv. No.	Pres.	Meth.	Filter

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
5	15	5.9	0.12	40
10	15.1	5.9	0.12	20
15	15.1	5.9	0.116	20
20	15.1	5.9	0.117	20
25	15.1	5.9	0.118	10
30	15.1	5.9	0.118	10

Comments:

Air Temp: 55 Degrees
Weather Conditions: Sunny

Crew Chief Signature [signature]

Date: 3/7/00 4/13/1999

Note:
Temperature is measured in Celsius
Turbidity is measured in NTU
Volume is measured in gallons

+Disk No.: C:\CHUCK\Logs.xls Well 2/2/99 15:07:26+

LMS Well Sampling Log

Date:	13-Apr-99	**METERS USED**	
Crew:	EH/NG	Temp.:	TLC#8
Job No:	650-422	pH:	DEC 4-99-04
Project:	NCIA Well Sampling	Cond.:	TLC#8
Project Site:	58 Sylvester	Turb.:	NYSDEC Monitek 21 PE SN# L-3324

Well ID No.: N-10326
Well Condition: fair
Well Depth/Diameter: 57.15 2"
Well Casing Type: pvc
Screened Interval: bottom 10 assumed
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 50.94
Water Column Ht./Vol.: 6.21 8.3
Purge Est.: 25
Purge Method(s): grundfos
Purge Date/Time(s): 13-Apr-99 1300-1315

Depth(s): all
Rates (gpm): 2.5
Purged Volume: >30
DTW After Purging: 50.94
Yield Rate: H
Purge Observations:

DTW Before Sampling: 50.97
Sample Date/Time: 13-Apr 1320
Sampling Method: teflon bailer
Sampling Depth(s): toc
DTW After Sampling: 50.94
Chain-of-Custody No.(s):
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C	pH	Sp. Cond	Turb.
Start	15.9	5.5	.237	10
End	15.8	5.5	.238	>100

SAMPLE ANALYSES

Parameter	Inv. No.	Pres. Meth.	Filter
VOCs	10	<4°C	N

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	15	5.6	.243	>200
5	15.5	5.5	.239	>100
10	16.1	5.6	.238	50
15	16.3	5.4	.238	25
20	15.9	5.5	.237	20
25	15.9	5.5	.237	10

Comments:

turbidity estimated, meter will
not calibrate.

Air Temp: 50's
Weather Conditions: sunny, breezy

Crew Chief Signature E Hollister Date: 3-7-00

LMS Well Sampling Log

Date: 15-Apr-99
Crew: EH/BM
Job No: 650-422
Project: NCIA well sampling
Project Site:

METERS USED

Temp.: TLC#8
pH: DEC 4-99-04
Cond.: TLC#8
Turb.: NYSDEC Monitek 21 PE SN# L-3324

Well ID No.: N-10327
Well Condition: POOR
Well Depth/Diameter: 55.0 2
Well Casing Type: PVC
Screened Interval: bottom 10
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 49.72
Water Column Ht./Vol.: 5.28/4.7
Purge Est.: 14.2
Purge Method(s): grundfos
Purge Date/Time(s): 15-Apr-99 1300- 1530

Depth(s): all
Rates (gpm): 0.25
Purged Volume: 15
DTW After Purging: 49.72
Yield Rate: L
Purge Observations:
black, full of sediment
slight sheen on water dry after 6 gals. Let sit for a few.
bailed the rest

DTW Before Sampling: 49.72
Sample Date/Time: 15-Apr 1545
Sampling Method: teflon bailer
Sampling Depth(s): toc
DTW After Sampling: 49.72
Chain-of-Custody No.(s):
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C	pH	Sp. Cond	Turb.
Start	15.4	5.3	.997	>200
End	15.9	5.3	1.002	>200

SAMPLE ANALYSES

Parameter	Inv. No.	Pres. Meth.	Filter
VOCs	34	<4°C	N
	38 blind dup		

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.	
0	16.6	6	.413	>200	g
3	20.2	5.8	.836	>200	g
6	17.7	5.6	.954	>100	g
9	16	5.5	.972	>200	b
12	15.2	5.4	1.011	>200	b
15	15.4	5.3	.997	>200	b

Comments:
blind dup N-72301
catches runoff from carwash lot

Air Temp: 60's
Weather Conditions: sunny

Crew Chief Signature E Holbit

Date: 3-7-00

R2-0000742

LMS Well Sampling Log

Date: 14-Apr-99
Crew: EH/SE
Job No: 650-422
Project: NCIA Well Sampling
Project Site: 979 Old Country (NY Ave)

METERS USED
Temp.: TLC#8
pH: DEC 4-99-04
Cond.: TLC#8
Turb.: NYSDEC Monitek 21 PE SN# L-3324

Well ID No.: N-10328
Well Condition: fair
Well Depth/Diameter: 53.80/2
Well Casing Type: pvc
Screened Interval: bottom 10
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 48.05
Water Column Ht./Vol.: 5.75 5.2
Purge Est.: 15.5
Purge Method(s): teflon bailer
Purge Date/Time(s): 14-Apr-99 1515-1635

Depth(s): all
Rates (gpm): .2
Purged Volume: 15
DTW After Purging: 48.04
Yield Rate: NA
Purge Observations:

DTW Before Sampling: 48.04
Sample Date/Time: 14-Apr 1640
Sampling Method: teflon bailer
Sampling Depth(s): toc
DTW After Sampling: 48.04
Chain-of-Custody No.(s):
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C	pH	Sp. Cond	Turb.
Start	15.5	6.3	.255	>100
End	15.6	6.3	.219	>100

SAMPLE ANALYSES

Parameter	Inv. No.	Pres. Meth.	Filter
VOCs	24	<4°C	N
	25 MS		
	26MSD		

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	16.3	5.6	.368	>100
3	15.7	5.8	.268	>100
6	15.5	5.9	.285	>200
9	15.1	6.1	.231	>200
12	15.4	5.9	.258	>200
15	15.5	6.3	.255	>100

16

Comments:
ms/msd

Air Temp: 60's
Weather Conditions: sunny, windy

Crew Chief Signature E Hollister

Date: 3-7-00

R2-0000743

LMS Well Sampling Log

Date: 14-Apr-99
Crew: EH/SE
Job No: 650-422
Project: NCIA Well Sampling
Project Site: 2520 Hyacinth

METERS USED

Temp.: TLC#8
pH: DEC 4-99-04
Cond.: TLC#8
Turb.: NYSDEC Monitek 21 PE SN# L-3324

Well ID No.: N-10329
Well Condition: fair
Well Depth/Diameter: 56'/2"
Well Casing Type: pvc
Screened Interval: bottom 10
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 50.5
Water Column Ht./Vol.: 5.50/4.9
Purge Est.: 15
Purge Method(s): grundfos
Purge Date/Time(s): 14-Apr-99 1215-1245

Depth(s): all
Rates (gpm): 1.5
Purged Volume: 18
DTW After Purging: 50.52
Yield Rate: **H**
Purge Observations:

DTW Before Sampling: 50.52
Sample Date/Time: 13-Apr 1300
Sampling Method: teflon bailer
Sampling Depth(s): toc
DTW After Sampling: 50.5
Chain-of-Custody No.(s):
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C	pH	Sp. Cond	Turb.
Start	16.7	5.5	.859	~25
End	16.1	5.6	.869	>100

SAMPLE ANALYSES

Parameter	Inv. No.	Pres. Meth.	Filter
VOCs	22	<4°C	N
	23 blind dup		

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	16.1	5.5	0.832	>200
3	16.6	5.3	0.776	>100
6	16.6	5.4	0.784	>100
9	16.4	5.6	0.811	>100
12	16.5	5.6	0.838	>100
15	16.3	5.5	0.847	~40
18	16.7	5.5	.859	~25

Comments:

Air Temp: 60
Weather Conditions: sunny, windy

blind dup
N-92301
turbidity estimated, meter will
not calibrate.

Crew Chief Signature E Hollist Date: 3-7-00

R2-0000744

LMS Well Sampling Log

Date:	14-Apr
Crew:	CJ DK
Job No:	650-422
Project:	NCIA Groundwater
Project Site:	

METERS USED	
Temp.:	TCL #10
pH:	DEC 4-99-02
Cond.:	TCL #10
Turb.:	LMS #001

Well ID No.:	N-10459
Well Condition:	Good
Well Depth/Diameter:	68'/2"
Well Casing Type:	PVC sch 40
Screened Interval:	58-68
Casing Ht./Lock No.:	none
Reference Pt.:	TOC
Depth to Water (DTW):	56.1
Water Column Ht./Vol.:	12'/16
Purge Est.:	50
Purge Method(s):	Grundfos 2"
Purge Date/Time(s):	4/14/1999 1420- 1440
Depth(s):	All
Rates (gpm):	5
Purged Volume:	50
DTW After Purging:	56.85
Yield Rate: L - M - H	H
Purge Observations:	

DTW Before Sampling:	56.1
Sample Date/Time:	4/14/99 - 1455
Sampling Method:	Teflon Bailer
Sampling Depth(s):	TOW
DTW After Sampling:	56.1
Chain-of-Custody No.(s):	
Analytical Lab(s):	H2M
Sampling Observations:	

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	14.7	4.3	275	225
End	14.9	4.4	267	90

SAMPLE ANALYSES

Parameters	Inv. No.	Pres.	Meth.	Filter
TCL VOC		HCl	95-1	No

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	14.8	4.7	270	350
10	14.9	4.4	280	300
20	14.8	4.4	282	300
30	14.8	4.4	278	50
40	14.7	4.3	272	200
50	14.7	4.3	275	225

Comments:

Air Temp: 16
Weather Conditions: Sunny Windy

Crew Chief Signature E Hellrit   Date: 3-7-00

Note:
Temperature is measured in Celsius
Turbidity is measured in NTU
Volume is measured in gallons

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R2-0000745

LMS Well Sampling Log

Date: 19-Apr-99
Crew: EH/DK
Job No: 650-422
Project: NCIA Well sampling
Project Site: [redacted]

METERS USED

Temp.: TLC#8
pH: DEC 4-99-04
Cond.: TLC#8
Turb.: s/n 19834

Well ID No.: N-10462
Well Condition: poor
Well Depth/Diameter: 63.4/2
Well Casing Type: pvc
Screened Interval: bottom 10
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 51.9
Water Column Ht./Vol.: 11.5/ 10.3
Purge Est.: 31
Purge Method(s): grundfos
Purge Date/Time(s): 4-19/ 1310-1330

Depth(s): all
Rates (gpm): 2
Purged Volume: 40
DTW After Purging: 51.9
Yield Rate: **M**
Purge Observations:
cleaned up quickly

DTW Before Sampling: 51.9
Sample Date/Time: 4-19/ 1415
Sampling Method: teflon bailer
Sampling Depth(s): toc
DTW After Sampling: 51.9
Chain-of-Custody No.(s):
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C	pH	Sp. Cond	Turb.
Start	15.7	5.8	.345	6.75
End	15.7	6.2	.289	>100

SAMPLE ANALYSES

Parameter	Inv. No.	Pres. Meth.	Filter
VOCs	47	<4°C	N

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	15.7	6.4		
7.5	15.4	5.8		
15	15.7	5.8		
22.5	15.4	5.8		
30	15.5	5.9		
37.5	15.7	5.8	0.345	6.75

Comments:

Air Temp: 60's
Weather Conditions: sunny, slightly breezy

Crew Chief Signature [illegible] Date: 3-7-00

R2-0000746

LMS Well Sampling Log

Date:	13-Apr
Crew:	BSM / DK
Job No:	650-
Project:	NCIA
Project Site:	Grand Blvd

METERS USED	
Temp.:	
pH:	
Cond.:	
Turb.:	

Well ID No.:	NC-18 (N-10464)
Well Condition:	Good
Well Depth/Diameter:	60' / 2"
Well Casing Type:	PVC
Screened Interval:	10'
Casing Ht./Lock No.:	Flush
Reference Pt.:	Notch on PVC
Depth to Water (DTW):	47.87'
Water Column Ht./Vol.:	12.13' / ~32 gal
Purge Est.:	~96 gal
Purge Method(s):	Grundfos
Purge Date/Time(s):	4/13/99 / 830
Depth(s):	~58'
Rates (gpm):	~3 GPM
Purged Volume:	~96 gal
DTW After Purging:	47.85'
Yield Rate: L - M - H	
Purge Observations:	

DTW Before Sampling:	47.82
Sample Date/Time:	4/13/99 / 915
Sampling Method:	Bailer
Sampling Depth(s):	~58'
DTW After Sampling:	47.82
Chain-of-Custody No.(s):	
Analytical Lab(s):	H2M
Sampling Observations:	

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	14.2	5.7	0.111	>200
End	14.6	5.7	0.103	125

SAMPLE ANALYSES

Parameters	Inv. No.	Pres.	Meth.	Filter

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
16	14.7	5.5	0.085	70
32	14.9	5.5	0.085	8
48	14.9	5.5	0.084	5
64	14.8	5.5	0.084	4
80	14.9	5.5	0.085	5
96	14.8	5.5	0.084	4

Comments:

Air Temp: 50 Degrees

Weather Conditions: Sunny

Crew Chief Signature E Hellrich

Date: 3-7-00 4/13/1999

Note:
Temperature is measured in Celsius
Turbidity is measured in NTU
Volume is measured in gallons

LMS Well Sampling Log

Date:	13-Apr
Crew:	BSM / DK
Job No:	650-
Project:	NCIA
Project Site:	80 Rushmore St

METERS USED

Temp.:	
pH:	
Cond.:	
Turb.:	

Well ID No.:	N-10465 (NC-19)
Well Condition:	Good
Well Depth/Diameter:	62' / 2"
Well Casing Type:	PVC
Screened Interval:	10'
Casing Ht./Lock No.:	Flush
Reference Pt.:	Notch on PVC
Depth to Water (DTW):	50.70'
Water Column Ht./Vol.:	11.3' / ~15 gal
Purge Est.:	~45 gal
Purge Method(s):	Grundfos
Purge Date/Time(s):	4/13/99 / 1400
Depth(s):	~60'
Rates (gpm):	3 GPM
Purged Volume:	~45 gal
DTW After Purging:	50.80'
Yield Rate: L - M - H	
Purge Observations:	

DTW Before Sampling:	50.80'
Sample Date/Time:	4/13/99 / 1445
Sampling Method:	Bailer
Sampling Depth(s):	~60'
DTW After Sampling:	50.77'
Chain-of-Custody No.(s):	
Analytical Lab(s):	H2M
Sampling Observations:	

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	14.5	5.9	0.256	>200
End	14.6	6.1	0.146	70

SAMPLE ANALYSES

Parameters	Inv. No.	Pres.	Meth.	Filter

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
10	14.8	5.9	0.206	>200
20	14.7	5.9	0.188	150
30	14.7	5.9	0.177	90
40	14.7	5.9	0.174	70
50	14.7	6	0.166	25

Comments:

Air Temp: 55 Degrees
Weather Conditions: Sunny

Crew Chief Signature E Hellrich

Date: 3-7-00
4/13/1999

Note:
Temperature is measured in Celsius
Turbidity is measured in NTU
Volume is measured in gallons

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R2-0000748

LMS Well Sampling Log

Date:	13-Apr-99
Crew:	EH/NG
Job No:	650-422
Project:	NCIA Well Sampling
Project Site:	17 Brooklyn

METERS USED

Temp.:	TLC#8
pH:	DEC 4-99-04
Cond.:	TLC#8
Turb.:	NYSDEC Monitek 21 PE SN# L-3324

Well ID No.: N-10470
Well Condition: good
Well Depth/Diameter: 64.9 /2"
Well Casing Type: PVC
Screened Interval: bottom 10
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 49.45
Water Column Ht./Vol.: 15.45 11.3
Purge Est.: 34
Purge Method(s): grundfos
Purge Date/Time(s): 13-Apr-99 0900-930

Depth(s): all
Rates (gpm): 2.5
Purged Volume: 50
DTW After Purging: 49.45
Yield Rate: **H**
Purge Observations:

DTW Before Sampling: 49.45
Sample Date/Time: 13-Apr 945
Sampling Method: teflon bailer
Sampling Depth(s): toc
DTW After Sampling: 49.45
Chain-of-Custody No.(s):
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C	pH	Sp. Cond	Turb.
Start	14.9	5.6	.349	15
End	13.8	5.6	.334	45

SAMPLE ANALYSES

Parameter	Inv. No.	Pres. Meth.	Filter
VOCs	09	<4°C	N

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	14.3	5.6	.479	>200
7.5	14.8	5.7	.469	>100
15	14.7	5.6	.423	50
22.5	15.1	5.6	.393	50
30	15	5.6	.370	25
35	14.9	5.6	.349	15

Comments:
slight odor
turbidity estimated, meter will
not calibrate.

Air Temp: 50's
Weather Conditions: sunny, breezy

Crew Chief Signature E Holhst Date: 3-7-00

R2-0000749

LMS Well Sampling Log

Date: 14-Apr-99
Crew: EH/SE
Job No: 650-422
Project: NCIA Well Sampling
Project Site: 50 State Street

METERS USED

Temp.: TLC#8
pH: DEC 4-99-04
Cond.: TLC#8
Turb.: NYSDEC Monitek 21 PE SN# L-3324

Well ID No.: N-10471
Well Condition: poor
Well Depth/Diameter: 104.25 2"
Well Casing Type: pvc
Screened Interval: bottom 10 assumed
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 47.9
Water Column Ht./Vol.: 56.25 18
Purge Est.: 54
Purge Method(s): grundfos
Purge Date/Time(s): 14-Apr-99 0845-915

Depth(s): all
Rates (gpm): 2.5
Purged Volume: 50
DTW After Purging: 49.15
Yield Rate: **H**
Purge Observations:

DTW Before Sampling: 47.9
Sample Date/Time: 14-Apr 1000
Sampling Method: teflon bailer
Sampling Depth(s): toc
DTW After Sampling 47.9
Chain-of-Custody No.(s):
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C	pH	Sp. Cond	Turb.
Start	14.8	5.8	.179	~50
End	14.5	5.8	.183	~100

SAMPLE ANALYSES

Parameter	Inv. No.	Pres. Meth.	Filter
VOCs	19	<4°C	N
	20 MS		
	21 MSD		

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	14.3	5.6	.191	>100
10	15.5	5.6	.199	>100
20	15.3	5.6	.199	>100
30	15.5	5.4	.199	>100
40	15.4	5.6	.202	>100
50	15.3	5.6	.202	~100
60	15.3	5.6	.202	~50

Comments:

ms/msd

Air Temp:
Weather Conditions:

Crew Chief Signature E Hallisten Date: 3-7-00

R2-0000750

LMS Well Sampling Log

Date:	15-Apr
Crew:	CJ DK
Job No:	650-422
Project:	NCIA Groundwater
Project Site:	

METERS USED	
Temp.:	TCL #10
pH:	DEC 4-99-02
Cond.:	TCL #10
Turb.:	LMS #001

Well ID No.:	N-10472
Well Condition:	Good
Well Depth/Diameter:	62'/2"
Well Casing Type:	PVC sch 80
Screened Interval:	52-62
Casing Ht./Lock No.:	none
Reference Pt.:	TOC
Depth to Water (DTW):	43.76
Water Column Ht./Vol.:	9'/14
Purge Est.:	42
Purge Method(s):	Grundfos 2"
Purge Date/Time(s):	4/15/1999 1550- 1620
Depth(s):	All
Rates (gpm):	3
Purged Volume:	42
DTW After Purging:	43.76
Yield Rate: L - M - H	M
Purge Observations:	

DTW Before Sampling:	43.76
Sample Date/Time:	4/15/99 - 1625
Sampling Method:	Teflon Bailer
Sampling Depth(s):	TOW
DTW After Sampling:	43.76
Chain-of-Custody No.(s):	
Analytical Lab(s):	H2M
Sampling Observations:	

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	14.9	6	234	100
End	14.9	6	229	120

SAMPLE ANALYSES

Parameters	Inv. No.	Pres.	Meth.	Filter
TCL VOC		HCl	95-1	No

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	15.3	6.3	262	>1000
8	14.9	5.9	251	400
16	15	6.6	212	>1000
24	15	5.8	245	400
36	15.1	5.7	244	450
42	15.2	5.7	250	25

Comments:

Air Temp: 16

Weather Conditions: Sunny

Crew Chief Signature E Hollist Date: 3-7-00

Note:
Temperature is measured in Celsius
Turbidity is measured in NTU
Volume is measured in gallons

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LMS Well Sampling Log

Date:	15-Apr	**METERS USED**	
Crew:	CJ DK	Temp.:	TCL #10
Job No:	650-422	pH:	DEC 4-99-02
Project:	NCIA Groundwater	Cond.:	TCL #10
Project Site:		Turb.:	LMS #001

Well ID No.:	N-10474	DTW Before Sampling:	46.95
Well Condition:	Fair	Sample Date/Time:	4/15/99 - 1020
Well Depth/Diameter:	60'/2"	Sampling Method:	Teflon Bailer
Well Casing Type:	PVC sch 80	Sampling Depth(s):	TOW
Screened Interval:	50-60	DTW After Sampling:	46.95
Casing Ht./Lock No.:	none	Chain-of-Custody No.(s):	
Reference Pt.:	TOC	Analytical Lab(s):	H2M
Depth to Water (DTW):	46.95	Sampling Observations:	
Water Column Ht./Vol.:	13'/16		
Purge Est.:	50		
Purge Method(s):	Grundfos 2"		
Purge Date/Time(s):	4/15/1999 950- 1010		
Depth(s):	All		
Rates (gpm):	4		
Purged Volume:	50		
DTW After Purging:	46.95		
Yield Rate: L - M - H	H		
Purge Observations:			

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	16.4	5.7	163	200
End	17	6.4	128	150

SAMPLE ANALYSES

Parameters	Inv. No.	Pres.	Meth.	Filter
TCL VOC		HCl	95-1	No

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	16.9	6	137	>1000
10	15.4	5.7	154	>1000
20	16.5	5.7	159	500
30	16.4	5.7	159	400
40	16.4	5.7	160	250
50	16.4	5.7	163	500

Comments:

Air Temp: 16

Weather Conditions: Sunny

Crew Chief Signature E Hollrith Date: 3-7-00

Note:
Temperature is measured in Celsius
Turbidity is measured in NTU
Volume is measured in gallons

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LMS Well Sampling Log

Date:	15-Apr		
Crew:	CJ DK		
Job No:	650-422		
Project:	NCIA Groundwater		
Project Site:			

METERS USED

Temp.:	TCL #10
pH:	DEC 4-99-02
Cond.:	TCL #10
Turb.:	LMS #001

Well ID No.:	N-10475
Well Condition:	Good
Well Depth/Diameter:	57'/2"
Well Casing Type:	PVC sch 80
Screened Interval:	47-57
Casing Ht./Lock No.:	none
Reference Pt.:	TOC
Depth to Water (DTW):	36.67
Water Column Ht./Vol.:	20'/16
Purge Est.:	48
Purge Method(s):	Grundfos 2"
Purge Date/Time(s):	4/15/1999 1400- 1445
Depth(s):	All
Rates (gpm):	3
Purged Volume:	16
DTW After Purging:	43.9
Yield Rate: L - M - H	L

Purge Observations:

Went Dry three times...

DTW Before Sampling:	43.9
Sample Date/Time:	4/14/99 - 1500
Sampling Method:	Teflon Bailer
Sampling Depth(s):	TOW
DTW After Sampling:	44.5
Chain-of-Custody No.(s):	
Analytical Lab(s):	H2M
Sampling Observations:	

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	13.3	6	99	>1000
End	13.4	6	103	>1000

SAMPLE ANALYSES

Parameters	Inv. No.	Pres.	Meth.	Filter
TCL VOC		HCl	95-1	No

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	13.6	6.7	160	>1000
12	14.4	6.2	120	>1000
16	13.3	6	103	>1000
-				
-				
-				

Comments:

Air Temp: 16

Weather Conditions: Sunny

Crew Chief Signature E Hollrith Date: 3-7-00

Note:
Temperature is measured in Celsius
Turbidity is measured in NTU
Volume is measured in gallons

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LMS Well Sampling Log

Date: 15-Apr
Crew: CJ DK
Job No: 650-422
Project: NCIA Groundwater
Project Site:

METERS USED

Temp.: TCL #10
pH: DEC 4-99-02
Cond.: TCL #10
Turb.: LMS #001

Well ID No.: N-10476
Well Condition: Poor
Well Depth/Diameter: 130'/4"
Well Casing Type: PVC sch 80
Screened Interval: 110-130
Casing Ht./Lock No.: none
Reference Pt.: TOC
Depth to Water (DTW): 43.77
Water Column Ht./Vol.: 86'/78
Purge Est.: 240
Purge Method(s): Grundfos 2"
Purge Date/Time(s): 4/15/1999
1120- 1335
Depth(s): All
Rates (gpm): 5
Purged Volume: 120
DTW After Purging: 119.05
Yield Rate: L - M - H L
Purge Observations:
Purged dry 4 times sampling after having removed about 120 gal.

DTW Before Sampling: 111.32
Sample Date/Time: 4/15/99 - 1340
Sampling Method: Teflon Bailer
Sampling Depth(s): TOW
DTW After Sampling: 103.37
Chain-of-Custody No.(s):
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	14.7	6.5	95	11
End	14.7	6.5	93	15

SAMPLE ANALYSES

Parameters	Inv. No.	Pres.	Meth.	Filter
TCL VOC		HCl	95-1	No

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	14.3	6.4	126	10
40	15.6	6.2	116	20
80	15.1	6.6	173	400
120	15	6.6	97	70
-				
-				

Comments:

Air Temp: 16
Weather Conditions: Sunny

Crew Chief Signature E Hollist Date: 3-7-00

Note:
Temperature is measured in Celsius
Turbidity is measured in NTU
Volume is measured in gallons

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R2-0000754

LMS Well Sampling Log

Date:	12-Apr
Crew:	CJ DK
Job No:	650-422
Project:	NCIA Groundwater
Project Site:	

METERS USED

Temp.:	TLC #10
pH:	DEC 4-99-02
Cond.:	TLC #10
Turb.:	LMS #001

Well ID No.:	N-10477
Well Condition:	Good
Well Depth/Diameter:	57'/2"
Well Casing Type:	PVC sch 40
Screened Interval:	47-57
Casing Ht./Lock No.:	none
Reference Pt.:	TOC
Depth to Water (DTW):	43.85
Water Column Ht./Vol.:	13'/16
Purge Est.:	50
Purge Method(s):	Grundfos 2"
Purge Date/Time(s):	4/12/1999 1420- 1440
Depth(s):	All
Rates (gpm):	5
Purged Volume:	50
DTW After Purging:	43.8
Yield Rate: L - M - H	H
Purge Observations:	

DTW Before Sampling:	43.8
Sample Date/Time:	4/12/99 - 1450
Sampling Method:	Teflon Bailer
Sampling Depth(s):	TOW
DTW After Sampling:	43.85
Chain-of-Custody No.(s):	
Analytical Lab(s):	H2M
Sampling Observations:	

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	16.8	4.9	445	150
End	16.7	5	482	200

SAMPLE ANALYSES

Parameters	Inv. No.	Pres.	Meth.	Filter
TCL VOC		HCl	95-1	No

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	16.2	5.1	439	700
10	16.9	5	454	>1000
20	16.9	5	486	650
30	16.8	4.9	444	600
40	16.8	4.9	446	300
50	16.8	4.9	445	150

Comments:

Air Temp: 10.1

Weather Conditions: Sunny Windy

Crew Chief Signature E. Holbrook Date: 3-7-00

Note:
Temperature is measured in Celsius
Turbidity is measured in NTU
Volume is measured in gallons

LMS Well Sampling Log

Date:	12-Apr
Crew:	CJ DK
Job No:	650-422
Project:	NCIA Groundwater
Project Site:	

METERS USED

Temp.:	TLC #10
pH:	DEC 4-99-02
Cond.:	TLC #10
Turb.:	LMS #001

Well ID No.:	N-10478
Well Condition:	Poor
Well Depth/Diameter:	121'/4"
Well Casing Type:	PVC sch 80
Screened Interval:	100-121
Casing Ht./Lock No.:	none
Reference Pt.:	TOC
Depth to Water (DTW):	43.95
Water Column Ht./Vol.:	77'/73
Purge Est.:	220
Purge Method(s):	Grundfos 2"
Purge Date/Time(s):	4/12/1999 1455-
Depth(s):	All
Rates (gpm):	6
Purged Volume:	220
DTW After Purging:	44.06
Yield Rate: L - M - H	H
Purge Observations:	

DTW Before Sampling:	44.06
Sample Date/Time:	4/12/99 - 1640
Sampling Method:	Teflon Bailer
Sampling Depth(s):	TOW
DTW After Sampling:	43.95
Chain-of-Custody No.(s):	
Analytical Lab(s):	H2M
Sampling Observations:	

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	15	5	201	3
End	15.4	5.2	205	15

SAMPLE ANALYSES

Parameters	Inv. No.	Pres.	Meth.	Filter
TCL VOC		HCl	95-1	No

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	15.1	5.5	202	15
44	15.5	5.2	205	10
88	15.3	5.2	204	7
132	15	5.2	202	4
176	15.1	5.2	200	4
220	15	5.1	201	3

Comments:
This well needs a pvc cap... It is open under the water cover.

Air Temp: 10.1
Weather Conditions: Sunny Windy

Crew Chief Signature E Hellwitz Date: 3-7-00

Note:
Temperature is measured in Celsius
Turbidity is measured in NTU
Volume is measured in gallons

+Disk No C:\CHUCK\Logs.xls Well 2/2/99 15:07:26+

LMS Well Sampling Log

Date: 12-Apr
Crew: CJ DK
Job No: 650-422
Project: NCIA Groundwater
Project Site:

METERS USED

Temp.: TLC #10
pH: DEC 4-99-02
Cond.: TLC #10
Turb.: LMS #001

Well ID No.:	N-10479
Well Condition:	Good
Well Depth/Diameter:	40'/2"
Well Casing Type:	PVC sch 40
Screened Interval:	30-40
Casing Ht./Lock No.:	none
Reference Pt.:	TOC
Depth to Water (DTW):	27.2
Water Column Ht./Vol.:	13/16.2
Purge Est.:	50
Purge Method(s):	Grundfos 2"
Purge Date/Time(s):	4/12/1999 1140- 1200
Depth(s):	All
Rates (gpm):	4.5
Purged Volume:	50
DTW After Purging:	27.2
Yield Rate: L - M - H	H
Purge Observations:	

DTW Before Sampling:	27.2
Sample Date/Time:	4/12/99 - 1205
Sampling Method:	Teflon Bailer
Sampling Depth(s):	TOW
DTW After Sampling:	27.2
Chain-of-Custody No.(s):	
Analytical Lab(s):	H2M
Sampling Observations:	

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	13.3	6.7	322	200
End	13.3	6.7	338	250

SAMPLE ANALYSES

Parameters	Inv. No.	Pres.	Meth.	Filter
TCL VOC		HCL	95-1	No

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	13.6	6.8	356	>1000
10	14.1	6.8	270	700
20	13.9	6.7	256	600
30	14	6.7	249	250
40	14.1	6.6	245	130
50	14.1	6.7	247	200

Comments:

Air Temp: 10.2
Weather Conditions: Sunny/Windy

Crew Chief Signature E Holbrook Date: 3-7-00

Note:
Temperature is measured in Celsius
Turbidity is measured in NTU
Volume is measured in gallons

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R2-0000757

LMS Well Sampling Log

Date:	14-Apr	METERS USED	
Crew:	CJ DK	Temp.:	TCL #10
Job No:	650-422	pH:	DEC 4-99-02
Project:	NCIA Groundwater	Cond.:	TCL #10
Project Site:		Turb.:	LMS #001

Well ID No.:	N-11848
Well Condition:	Good
Well Depth/Diameter:	60'/2"
Well Casing Type:	PVC sch 40
Screened Interval:	50-55
Casing Ht./Lock No.:	none
Reference Pt.:	TOC
Depth to Water (DTW):	40.46
Water Column Ht./Vol.:	20'/11.5
Purge Est.:	35
Purge Method(s):	Grundfos 2"
Purge Date/Time(s):	4/14/1999 1520- 1545
Depth(s):	All
Rates (gpm):	4
Purged Volume:	35
DTW After Purging:	45.24
Yield Rate: L - M - H	M
Purge Observations:	Went Dry once

DTW Before Sampling:	40.46
Sample Date/Time:	4/14/99 - 1555
Sampling Method:	Teflon Bailer
Sampling Depth(s):	TOW
DTW After Sampling:	40.46
Chain-of-Custody No.(s):	
Analytical Lab(s):	H2M
Sampling Observations:	

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	15.4	6.4	138	350
End	14.8	6.5	151	500

SAMPLE ANALYSES

Parameters	Inv. No.	Pres.	Meth.	Filter
TCL VOC		HCl	95-1	No

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	15.4	6	184	>1000
7	15	6.3	129	600
14	15.1	6.4	130	250
21	15	6.3	138	300
28	15.8	6.3	136	400
35	15.4	6.4	138	350

Comments:

Air Temp: 16

Weather Conditions: Sunny Windy

Crew Chief Signature E. Holbrook Date: 3-7-00

Note:
Temperature is measured in Celsius
Turbidity is measured in NTU
Volume is measured in gallons

+Disk No : C:\CHUCK\Logs xls Well 2/2/99 15 07 26+

LMS Well Sampling Log

Date: 14-Apr
Crew: CJ DK
Job No: 650-422
Project: NCIA Groundwater
Project Site:

METERS USED
Temp.: TCL #10
pH: DEC 4-99-02
Cond.: TCL #10
Turb.: LMS #001

Well ID No.:	N-11849
Well Condition:	Good
Well Depth/Diameter:	60'/2"
Well Casing Type:	PVC sch 40
Screened Interval:	50-55
Casing Ht./Lock No.:	none
Reference Pt.:	TOC
Depth to Water (DTW):	46.45
Water Column Ht./Vol.:	14'/10.4
Purge Est.:	35
Purge Method(s):	Grundfos 2"
Purge Date/Time(s):	4/14/1999 1245- 1305
Depth(s):	All
Rates (gpm):	4
Purged Volume:	35
DTW After Purging:	46.6
Yield Rate: L - M - H	H

Purge Observations:

DTW Before Sampling:	46.45
Sample Date/Time:	4/14/99 - 1315
Sampling Method:	Teflon Bailer
Sampling Depth(s):	TOW
DTW After Sampling:	46.45
Chain-of-Custody No.(s):	
Analytical Lab(s):	H2M

Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	14.9	5.9	219	95
End	12.7	5.9	170	125

SAMPLE ANALYSES

Parameters	Inv. No.	Pres.	Meth.	Filter
TCL VOC		HCl	95-1	No

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	14.9	6.4	777	>1000
7	14.8	6.4	242	225
14	14.8	6.4	230	90
21	14.8	6	224	70
28	15	6	223	90
35	14.9	5.9	219	95

Comments:

Air Temp: 17.2
Weather Conditions: Sunny

Crew Chief Signature E Hellrich   Date: 3-7-00

Note:
Temperature is measured in Celsius
Turbidity is measured in NTU
Volume is measured in gallons

LMS Well Sampling Log

Date: 13-Apr
Crew: BSM / DK
Job No: 650-
Project: NCIA
Project Site: Grand Blvd and Hopper St

METERS USED
Temp.:
pH:
Cond.:
Turb.:

Well ID No.:	N-11850
Well Condition:	Good
Well Depth/Diameter:	65' / 2"
Well Casing Type:	PVC
Screened Interval:	10'
Casing Ht./Lock No.:	Flush
Reference Pt.:	Notch on PC
Depth to Water (DTW):	48.97'
Water Column Ht./Vol.:	16.03'
Purge Est.:	~50 gal
Purge Method(s):	Grundfos
Purge Date/Time(s):	4/13/99 / 930
Depth(s):	~63'
Rates (gpm):	3 GPM
Purged Volume:	~50 gal
DTW After Purging:	48.90'

Yield Rate: L - M - H
Purge Observations:

DTW Before Sampling:	48.90'
Sample Date/Time:	4/13/99 / 1015
Sampling Method:	Bailer
Sampling Depth(s):	~63'
DTW After Sampling:	48.92'
Chain-of-Custody No.(s):	
Analytical Lab(s):	H2M

Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	14.9	6.2	0.399	>200
End	15.8	6.6	0.217	>200

SAMPLE ANALYSES

Parameters	Inv. No.	Pres.	Meth.	Filter

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
8	15.4	6.2	0.378	40
16	15.4	6.2	0.382	15
24	15.5	6.2	0.387	10
32	15.5	6.2	0.391	6
40	15.5	6.1	0.393	5
48	15.4	6.2	0.398	12

Comments:

Air Temp: 55 Degrees
Weather Conditions: Sunny

Crew Chief Signature E Hollit

Date: 3-7-00 4/13/1999

Note:
Temperature is measured in Celsius
Turbidity is measured in NTU
Volume is measured in gallons

LMS Well Sampling Log

Date:	14-Apr
Crew:	CJ DK
Job No:	650-422
Project:	NCIA Groundwater
Project Site:	

METERS USED

Temp.:	TCL #10
pH:	DEC 4-99-02
Cond.:	TCL #10
Turb.:	LMS #001

Well ID No.:	N-11851
Well Condition:	Good
Well Depth/Diameter:	65'/2"
Well Casing Type:	PVC sch 40
Screened Interval:	55-60
Casing Ht./Lock No.:	none
Reference Pt.:	TOC
Depth to Water (DTW):	49.3
Water Column Ht./Vol.:	16'/10.8
Purge Est.:	35
Purge Method(s):	Grundfos 2"
Purge Date/Time(s):	4/14/1999 930- 950
Depth(s):	All
Rates (gpm):	4
Purged Volume:	35
DTW After Purging:	49.3
Yield Rate: L - M - H	H
Purge Observations:	

DTW Before Sampling:	49.3
Sample Date/Time:	4/14/99 - 1000
Sampling Method:	Teflon Bailer
Sampling Depth(s):	TOW
DTW After Sampling:	49.3
Chain-of-Custody No.(s):	
Analytical Lab(s):	H2M
Sampling Observations:	

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	16.1	6.4	606	100
End	16.4	6.4	435	250

SAMPLE ANALYSES

Parameters	Inv. No.	Pres.	Meth.	Filter
TCL VOC		HCl	95-1	No

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	15.2	6.3	660	400
7	15.9	6.3	660	300
14	16	6.1	617	100
21	16	6.3	610	150
28	16.1	6.3	607	250
35	16.1	6.4	606	100

Comments:

Air Temp: 16.8
Weather Conditions: Sunny

Crew Chief Signature E Hollich Date: 8-7-00

Note:
Temperature is measured in Celsius
Turbidity is measured in NTU
Volume is measured in gallons

LMS Well Sampling Log

Date:	14-Apr		METERS USED
Crew:	CJ DK	Temp.:	TCL #10
Job No:	650-422	pH:	DEC 4-99-02
Project:	NCIA Groundwater	Cond.:	TCL #10
Project Site:		Turb.:	LMS #001

Well ID No.:	N-11852
Well Condition:	Good
Well Depth/Diameter:	100'/2"
Well Casing Type:	PVC sch 40
Screened Interval:	90-95
Casing Ht./Lock No.:	none
Reference Pt.:	TOC
Depth to Water (DTW):	49.36
Water Column Ht./Vol.:	50'/16.5
Purge Est.:	50
Purge Method(s):	Grundfos 2"
Purge Date/Time(s):	4/14/1999 830- 855
Depth(s):	All
Rates (gpm):	5
Purged Volume:	50
DTW After Purging:	49.36
Yield Rate: L - M - H	H
Purge Observations:	

DTW Before Sampling:	49.36
Sample Date/Time:	4/14/99 - 0905
Sampling Method:	Teflon Bailer
Sampling Depth(s):	TOW
DTW After Sampling:	49.36
Chain-of-Custody No.(s):	
Analytical Lab(s):	H2M
Sampling Observations:	

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	14.9	5.5	274	50
End	14.9	6	225	15

SAMPLE ANALYSES

Parameters	Inv. No.	Pres.	Meth.	Filter
TCL VOC		HCl	95-1	No

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	13.7	6.2	203	7
10	14.6	5.9	219	17
20	14.7	5.8	275	74
30	14.8	5.6	274	85
40	14.7	5.6	279	14
50	14.9	5.5	274	50

Comments:

Air Temp: 16.8

Weather Conditions: Sunny

Crew Chief Signature E Hollyth Date: 3-7-00

Note:
Temperature is measured in Celsius
Turbidity is measured in NTU
Volume is measured in gallons

+Disk No C:\CHUCK\Logs.xls Well 2/2/99 15:07 26+

R2-0000762

LMS Well Sampling Log

Date: 13-Apr-99
Crew: EH/NG
Job No: 650-422
Project: NCIA Well Sampling
Project Site: 967 Old Country (Sylvester)

METERS USED
Temp.: TLC#8
pH: DEC 4-99-04
Cond.: TLC#8
Turb.: NYSDEC Monitek 21 PE SN# L-3324

Well ID No.: N-11854
Well Condition: fair
Well Depth/Diameter: 59.87 2"
Well Casing Type: pvc
Screened Interval: bottom 5 '+ 5' sump
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 49.01
Water Column Ht./Vol.: 10.86/14.5
Purge Est.: 44
Purge Method(s): grundfos
Purge Date/Time(s): 13-Apr-99 1500-1530

Depth(s): all
Rates (gpm): 2
Purged Volume: 50
DTW After Purging: 49.02
Yield Rate: **M**
Purge Observations:
slow rate, but recovers quickly

DTW Before Sampling: 49.02
Sample Date/Time: 13-Apr 0.6563
Sampling Method: teflon bailer
Sampling Depth(s): toc
DTW After Sampling: 49.01
Chain-of-Custody No.(s):
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C	pH	Sp. Cond	Turb.
Start	17.6	4.1	.587	10
End	16.9	3.9	.817	>100

SAMPLE ANALYSES

Parameter	Inv. No.	Pres. Meth.	Filter
VOCs	11	<4°C	N

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	16.8	3.9	1.065	>200
10	13	4	.624	50
20	17.1	4	.611	25
30	16.6	4.1	.604	10
40	17.4	4	.585	10
50	17.6	4.1	.587	10

Comments:
turbidity estimated, meter will not calibrate.

Air Temp: 50's
Weather Conditions: sunny, breezy

Crew Chief Signature E Hollister Date: 3-7-00

LMS Well Sampling Log

Date: 13-Apr-99
Crew: EH/NG SE
Job No: 650-422
Project: NCIA Well Sampling
Project Site: 989 Old Country (Brooklyn)

METERS USED
Temp.: TLC#8
pH: DEC 4-99-04
Cond.: TLC#8
Turb.: NYSDEC SN 19834

Well ID No.: N-11855
Well Condition: fair
Well Depth/Diameter: 61.5 2"
Well Casing Type: pvc
Screened Interval: bottom 5 '+ 5' sump
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 47.19
Water Column Ht./Vol.: 14.31 11.1
Purge Est.: 35
Purge Method(s): grundfos
Purge Date/Time(s): 13-Apr-99 1100-1115, 1230-1430
Depth(s): all
Rates (gpm): 2.5 ,<.25
Purged Volume: 35
DTW After Purging: 47.19
Yield Rate: L - M - H
Purge Observations: water very silty

DTW Before Sampling: 47.19
Sample Date/Time: 13-Apr 1440
Sampling Method: teflon bailer
Sampling Depth(s): toc
DTW After Sampling: 47.19
Chain-of-Custody No.(s):
Analytical Lab(s): H2M
Sampling Observations:
silty

SAMPLE CHEMISTRIES

	Temp. (°C	pH	Sp. Cond	Turb.
Start	16.1	6.3	.627	>100
End	15.9	6.2	.573	>200

SAMPLE ANALYSES

Parameter	Inv. No.	Pres. Meth.	Filter
VOCs	18	<4°C	N

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	15.1	6.2	.711	>100
7.5	16.5	6.3	.744	>200
17.5	16.5	6.4	.627	>200
22.5	16.3	6.3	.642	>200
30	16.3	6.2	0.628	>200
35	16.1	6.3	.627	>100

Comments: purged dry after 7.5 gals.
SE took over, using bailer.

Air Temp: 50's
Weather Conditions: sunny, windy

Crew Chief Signature E Hollbath

Date: 3-7-00

R2-0000764

LMS Well Sampling Log

Date: 14-Apr
Crew: CJ DK
Job No: 650-422
Project: NCIA Groundwater
Project Site:

METERS USED
Temp.: TCL #10
pH: DEC 4-99-02
Cond.: TCL #10
Turb.: LMS #001

Well ID No.: N-11858
Well Condition: Good
Well Depth/Diameter: 60'/2"
Well Casing Type: PVC sch 40
Screened Interval: 50-55
Casing Ht./Lock No.: none
Reference Pt.: TOC
Depth to Water (DTW): 44.78
Water Column Ht./Vol.: 15'/10.7
Purge Est.: 35
Purge Method(s): Grundfos 2"
Purge Date/Time(s): 4/14/1999
1040- 1130
Depth(s): All
Rates (gpm): 2
Purged Volume: 35
DTW After Purging: 53.2
Yield Rate: L - M - H L
Purge Observations: Purged dry several times

DTW Before Sampling: 46.9
Sample Date/Time: 4/14/99 - 1140
Sampling Method: Teflon Bailer
Sampling Depth(s): TOW
DTW After Sampling: 46.75
Chain-of-Custody No.(s):
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	15.7	6.4	175	6
End	16.1	6.4	208	4

SAMPLE ANALYSES

Parameters	Inv. No.	Pres.	Meth.	Filter
TCL VOC		HCl	95-1	No

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	15.8	6.4	164	300
7	16.4	6.4	146	300
14	16.3	6.4	132	200
21	16.3	6.3	170	9
28	15.6	6.2	180	5
35	15.7	6.4	175	6

Comments:

Air Temp: 16.8
Weather Conditions: Sunny

Crew Chief Signature E Holbrook Date: 3-7-00

Note:
Temperature is measured in Celsius
Turbidity is measured in NTU
Volume is measured in gallons

LMS Well Sampling Log

Date: 19-Apr-99
Crew: EH/DK
Job No: 650-422
Project: NCIA Well sampling
Project Site: Grayston & OCR

METERS USED
Temp.: TLC#8
pH: DEC 4-99-04
Cond.: TLC#8
Turb.: s/n 19834

Well ID No.: N-11859
Well Condition: good
Well Depth/Diameter: 60.2/2
Well Casing Type: pvc
Screened Interval: bottom 5 + 5' sump
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 46.8
Water Column Ht./Vol.: 13.4/ 11.0
Purge Est.: 33
Purge Method(s): grundfos
Purge Date/Time(s): 4-19/ 1450-1510

Depth(s): all
Rates (gpm): 2
Purged Volume: 36
DTW After Purging: 46.8
Yield Rate: H
Purge Observations:

DTW Before Sampling: 46.8
Sample Date/Time: 4-19/ 1525
Sampling Method: teflon bailer
Sampling Depth(s): toc
DTW After Sampling 46.8
Chain-of-Custody No.(s):
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C	pH	Sp. Cond	Turb.
Start	15.9	5.3	.147	14.6
End	15.8	5.6	.141	>100

SAMPLE ANALYSES

Parameter	Inv. No.	Pres. Meth.	Filter
VOCs	48	<4°C	N

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	15.7	5.8	.147	>200
6	15.9	5.6	.141	19.1
12	16	5.5	.142	10.4
18	15.8	5.5	.140	4.3
24	15.9	5.5	.142	3.7
30	15.8	5.3	.144	1.7
36	15.9	5.3	.147	14.6

Comments:

Air Temp: 60's
Weather Conditions: sunny, slight breeze, drizzle towards end.

Crew Chief Signature E Holtcht   Date: 3-7-00

R2-0000766

LMS Well Sampling Log

Date: 16-Apr-99
Crew: SE/EH
Job No: 650-422
Project: NCIA Well Sampling
Project Site: 2541 Aster

METERS USED

Temp.: TLC#8
pH: DEC 4-99-04
Cond.: TLC#8
Turb.: NYSDEC Monitek 21 PE SN# L-3324

Well ID No.: N-11860
Well Condition: fair
Well Depth/Diameter: 60.15/2"
Well Casing Type: pvc
Screened Interval: bottom 5
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 46.32
Water Column Ht./Vol.: 13.83/10.5
Purge Est.:
Purge Method(s): grundfos
Purge Date/Time(s): 4-16/ 0830-0910

Depth(s): all
Rates (gpm): 2-3
Purged Volume: 50
DTW After Purging: 46.37
Yield Rate: L
Purge Observations: dry after 5 gals. Let sit, purged slower ~1.5 - 2 gpm.

DTW Before Sampling: 46.37
Sample Date/Time: 4-16/ 0915
Sampling Method: teflon bailer
Sampling Depth(s): toc
DTW After Sampling: 46.37
Chain-of-Custody No.(s):
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C	pH	Sp. Cond	Turb.
Start	15.2	5.6	.170	~25
End	14.6	5.7	.140	>200

SAMPLE ANALYSES

Parameter	Inv. No.	Pres. Meth.	Filter
VOCs	42	<4°C	N

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	14.5	6.2	.166	>200
10	15.9	5.8	.171	>100
20	15.6	5.7	.172	>200
30	15.3	5.5	.171	~25
40	15.4	5.6	.171	~10
50	15.2	5.6	.170	~25

Comments:

turbidity estimated, meter will not calibrate.

Air Temp: 60's
Weather Conditions: sunny

Crew Chief Signature E Elliott

Date: 3-7-00

R2-0000767

LMS Well Sampling Log

Date: 16-Apr-99
Crew: SE/EH
Job No: 650-422
Project: NCIA Well sampling
Project Site: 1054 Bowling Green Dr.

METERS USED

Temp.: TLC#8
pH: DEC 4-99-04
Cond.: TLC#8
Turb.: NYSDEC Monitek 21 PE SN# L-3324

Well ID No.: N-11861
Well Condition: good
Well Depth/Diameter: 60.1 / 2
Well Casing Type: pvc
Screened Interval: bottom 5 + 5' sump
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 46.17
Water Column Ht./Vol.: 13.93 / 11.1
Purge Est.: 33
Purge Method(s): grundfos
Purge Date/Time(s): 4-16 / 1015-1035

Depth(s): all
Rates (gpm): 2
Purged Volume: 40
DTW After Purging: 46.2
Yield Rate: **H**
Purge Observations:

DTW Before Sampling: 46.2
Sample Date/Time: 16-Apr 1040
Sampling Method: teflon bailer
Sampling Depth(s): toc
DTW After Sampling: 46.2
Chain-of-Custody No.(s):
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C	pH	Sp. Cond	Turb.
Start	15.4	4.8	.129	~100
End	14.8	5	.120	>100

SAMPLE ANALYSES

Parameter	Inv. No.	Pres. Meth.	Filter
VOCs	43	<4°C	N

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	14.2	5.4	.249	>100
7.5	14.9	5	.131	>100
15	15.3	4.8	.130	>100
22.5	15.2	4.8	.130	>100
30	15	4.8	.132	>100
37.5	15.4	4.8	.129	~100

Comments:

Air Temp: 60's
Weather Conditions: sunny

Crew Chief Signature E Helliwth

Date: 3-7-00

R2-0000768

LMS Well Sampling Log

Date:	12-Apr	METERS USED	
Crew:	CJ DK	Temp.:	TLC #10
Job No:	650-422	pH:	DEC 4-99-02
Project:	NCIA Groundwater	Cond.:	TLC #10
Project Site:		Turb.:	LMS #001

Well ID No.:	N-11862	DTW Before Sampling:	45.39
Well Condition:	Good	Sample Date/Time:	4/12/99 - 1315
Well Depth/Diameter:	60'/2"	Sampling Method:	Teflon Bailer
Well Casing Type:	PVC sch 40	Sampling Depth(s):	TOW
Screened Interval:	50-55	DTW After Sampling:	43.15
Casing Ht./Lock No.:	none	Chain-of-Custody No.(s):	
Reference Pt.:	TOC	Analytical Lab(s):	H2M
Depth to Water (DTW):	43.15	Sampling Observations:	
Water Column Ht./Vol.:	17'/11		
Purge Est.:	33		
Purge Method(s):	Grundfos 2"		
Purge Date/Time(s):	4/12/1999 1250- 1310		
Depth(s):	All		
Rates (gpm):	4		
Purged Volume:	33		
DTW After Purging:	45.39		
Yield Rate: L - M - H	H		
Purge Observations:			

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	15.1	5.1	209	375
End	14.7	5.4	213	275

SAMPLE ANALYSES

Parameters	Inv. No.	Pres.	Meth.	Filter
TCL VOC		HCl	95-1	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	15.2	5.3	239	450
6	15.3	5.2	214	200
12	15.3	5.1	211	90
18	15.1	5.1	209	20
24	15	5.1	210	14
33	15.1	5.1	209	375

Comments:

Air Temp: 10.1

Weather Conditions: Sunny Windy

Crew Chief Signature E Hollister Date: 3-7-00

Note:
Temperature is measured in Celsius
Turbidity is measured in NTU
Volume is measured in gallons

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R2-0000769

LMS Well Sampling Log

Date: 12-Apr-99
Crew: EH/BM
Job No: 650-422
Project: NCIA WELL SAMPLING
Project Site: NE corner Bond & Main

METERS USED
Temp.: TLC#8
pH: DEC 4-99-04
Cond.: TLC#8
Turb.: NYSDEC Monitek 21 PE SN# L-3324

Well ID No.: Anson MW-8
Well Condition: fair
Well Depth/Diameter: 57.5/4"
Well Casing Type: PVC
Screened Interval: bottom 10'
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 50.9
Water Column Ht./Vol.: 6.60'/11.1
Purge Est.: 33.3
Purge Method(s): grundfos and teflon bailer
Purge Date/Time(s): 12-Apr-99 10:45-13:30

Depth(s): all
Rates (gpm): 0.25
Purged Volume: 35
DTW After Purging: 50.94
Yield Rate: L
Purge Observations: grundfos drew well down too fast,
had to bail after first 5 gallons
silty and sandy/tan

DTW Before Sampling: 50.94
Sample Date/Time: 4-12/13:30
Sampling Method: teflon bailer
Sampling Depth(s): toc
DTW After Sampling: 50.94
Chain-of-Custody No.(s):
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C	pH	Sp. Cond	Turb.
Start	14.7	4.7	.121	>200
End	14.2	4.6	.118	>200

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs	06	<4°C	N

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	14.6	5.2	.153	>100
5	15.4	5	.149	>200
10	14.9	4.5	.142	>200
15	14.7	4.6	.131	>200
20	14.9	4.6	.125	>200
25	14.7	4.7	.121	>200
30	14.6	4.7	.118	>200

Comments:

Air Temp: 50's
Weather Conditions: sunny, few clouds, breezy

Crew Chief Signature E Hollrith Date: 3-7-00

R2-0000770

LMS Well Sampling Log

Date:	15-Apr-99	METERS USED	
Crew:	EH/BM	Temp.:	TLC#8
Job No:	650-422	pH:	DEC 4-99-04
Project:	NCIA well sampling	Cond.:	TLC#8
Project Site:	alley between Sylvester and Kinkle	Turb.:	NYSDEC Monitek 21 PE SN# L-3324

Well ID No.: FLMW-204B
Well Condition: GOOD
Well Depth/Diameter: 110/2
Well Casing Type: pvc
Screened Interval: bottom 10
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 51.86
Water Column Ht./Vol.: 60.99/24.1
Purge Est.: 72.2
Purge Method(s): grundfos
Purge Date/Time(s): 15-Apr-99 0845-0925

Depth(s): all
Rates (gpm): 2.5
Purged Volume: >75
DTW After Purging: 51.88
Yield Rate: L - M - **H**
Purge Observations:

DTW Before Sampling: 51.86
Sample Date/Time: 15-Apr 930
Sampling Method: teflon bailer
Sampling Depth(s): toc
DTW After Sampling: 51.86
Chain-of-Custody No.(s):
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C	pH	Sp. Cond	Turb.
Start	15.0	5.4	.421	~10
End	14.6	5.4	.422	>200

SAMPLE ANALYSES

Parameter	Inv. No.	Pres. Meth.	Filter
VOCs	32	<4°C	N

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	14.5	5.6	.424	>200
12.5	14.9	5.4	.428	>100
25	14.6	5.4	.427	~100
37.5	14.8	5.4	.424	~50
50	14.9	5.4	.424	~25
62.5	14.9	5.4	.421	~10
75	15.0	5.4	.421	~10

Comments:

turbidity estimated, meter will
not calibrate.

Air Temp: 50'S-60
Weather Conditions: SUNNY

Crew Chief Signature E Hollyth Date: 3-7-00

LMS Well Sampling Log

Date:	15-Apr-99	**METERS USED**	
Crew:	EH/BM	Temp.:	TLC#8
Job No:	650-422	pH:	DEC 4-99-04
Project:	NCIA well sampling	Cond.:	TLC#8
Project Site:	57 Kinkle	Turb.:	NYSDEC Monitek 21 PE SN# L-3324

Well ID No.: FLMW-205B
Well Condition: GOOD
Well Depth/Diameter: 110/2
Well Casing Type: PVC
Screened Interval: BOTTOM 10
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 50.92
Water Column Ht./Vol.: 59.08/18.5
Purge Est.: 55.4
Purge Method(s): GRUNDFOS
Purge Date/Time(s): 13-Apr-99 1015-1030

Depth(s): ALL
Rates (gpm): 4
Purged Volume: 60
DTW After Purging: 50.92
Yield Rate: **H**
Purge Observations:

DTW Before Sampling: 50.92
Sample Date/Time: 15-Apr 1045
Sampling Method: teflon bailer
Sampling Depth(s): toc
DTW After Sampling: 50.92
Chain-of-Custody No.(s):
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C	pH	Sp. Cond	Turb.
Start	14.5	5.3	.312	>100
End	14.8	6.1	.310	~50

SAMPLE ANALYSES

Parameter	Inv. No.	Pres. Meth.	Filter
VOCs	33	<4°C	N

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	14.5	5.2	.313	>200
10	14.6	5.1	.312	>200
20	14.3	5.3	.311	>100
30	14.4	5.3	.314	>100
40	14.1	5.4	.313	>100
50	14.5	5.5	.312	>100
60	14.5	5.3	.312	>100

Comments:

Air Temp: 60
Weather Conditions: SUNNY

Crew Chief Signature E Hollister Date: 3-7-00

R2-0000772

LMS Well Sampling Log

Date: 16-Apr-99
Crew: SE/EH
Job No: 650-422
Project: NCIA Well Sampling
Project Site: NE Hopper & Main

METERS USED
Temp.: TLC#8
pH: DEC 4-99-04
Cond.: TLC#8
Turb.: sn 19834

Well ID No.: NE Hopper & Main
Well Condition: fair
Well Depth/Diameter: 65/4
Well Casing Type: pvc
Screened Interval: assume bottom 10
Casing Ht./Lock No.: -0.65
Reference Pt.: TOC
Depth to Water (DTW): 51.15
Water Column Ht./Vol.: 13.85/21.4
Purge Est.: 64.1
Purge Method(s): grundfos
Purge Date/Time(s): 16-Apr-99 1210-1240

Depth(s): all
Rates (gpm): 2.5
Purged Volume: 65
DTW After Purging: 51.17
Yield Rate: L - M - H
Purge Observations:

DTW Before Sampling: 51.17
Sample Date/Time: 16-Apr 1300
Sampling Method: teflon bailer
Sampling Depth(s): toc
DTW After Sampling: 51.16
Chain-of-Custody No.(s):
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	pH	Sp. Cond	Turb.
Start	5.6	0.129	4
End	5.6	0.132	39

SAMPLE ANALYSES

Parameters		Pres. Meth.	Filter
VOCs	44	<4°C	N

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	14.2	5.7	.100	>100
15	14.6	5.6	.106	26
30	14.4	5.6	.118	10
45	14.6	5.6	.129	8
60	14.5	5.6	.129	4
65	14.5	5.6	.129	4

Comments:

Air Temp: 60's
Weather Conditions: sunny

Crew Chief Signature E Hollister Date: 3-7-00

R2-0000773

LMS Well Sampling Log

Date: 20-Apr-99
Crew: EH/DK
Job No: 650-422
Project: NCIA Well Sampling
Project Site: Salisbury

METERS USED
Temp.: TLC#8
pH: DEC 4-99-04
Cond.: TLC#8
Turb.: SN 19834

Well ID No.: NRMW-1
Well Condition: new
Well Depth/Diameter: 70.36 2
Well Casing Type: pvc
Screened Interval: bottom 10
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 40.65
Water Column Ht./Vol.: 29.71 13.7
Purge Est.: 41
Purge Method(s): grundfos
Purge Date/Time(s): 20-Apr-99 1110-1130

Depth(s): all
Rates (gpm): 2.5
Purged Volume: >50
DTW After Purging: 40.66
Yield Rate: H
Purge Observations:
tan, silty

DTW Before Sampling: 40.65
Sample Date/Time: 20-Apr 1145
Sampling Method: teflon bailer
Sampling Depth(s): toc
DTW After Sampling: 40.65
Chain-of-Custody No.(s):
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C	pH	Sp. Cond	Turb.
Start	14.1	5.1	.151	>100
End	14.0	5.7	.148	15

SAMPLE ANALYSES

Parameter	Inv. No.	Pres. Meth.	Filter
VOCs	52	<4°C	N

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.	
0	13.8	5.3	.148	>100	
10	14.3	5.1	.150	55	raised pump 5'
20	14.4	5.2	.149	>100	
30	14.3	5.3	.152	>100	
40	14.2	5.1	.152	9	raised pump 5'
50	14.1	5.1	.151	>100	

Comments:

Air Temp: 50's
Weather Conditions: rain

Crew Chief Signature E Hollister Date: 3-7-00

R2-0000774

LMS Well Sampling Log

Date: 20-Apr-99
Crew: EH/DK
Job No: 650-422
Project: NCIA Well Sampling
Project Site:

METERS USED

Temp.: TLC#8
pH: DEC 4-99-04
Cond.: TLC#8
Turb.: SN 19834

Well ID No.: NRMW-2
Well Condition: new
Well Depth/Diameter: 70.20 2
Well Casing Type: pvc
Screened Interval: bottom 10
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 44.43
Water Column Ht./Vol.: 25.77 13.0
Purge Est.: 39.1
Purge Method(s): grundfos
Purge Date/Time(s): 20-Apr-99 0955-1015

Depth(s): all
Rates (gpm): 2
Purged Volume: 40
DTW After Purging: 44.43
Yield Rate: H
Purge Observations:
SILTY, TAN

DTW Before Sampling: 44.43
Sample Date/Time: 20-Apr 1030
Sampling Method: teflon bailer
Sampling Depth(s): toc
DTW After Sampling: 44.43
Chain-of-Custody No.(s):
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C	pH	Sp. Cond	Turb.
Start	14.8	5.4	.225	>100
End	14.5	6.6	.146	15

SAMPLE ANALYSES

Parameter	Inv. No.	Pres. Meth.	Filter
VOCs	51	<4°C	N

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.	
0	14.1	5.3	.224	>100	
10	14.7	5.1	.226	25	raised pump 5'
20	14.8	5.1	.226	>100	
30	14.8	5.6	.226	8	raised pump 5'
40	14.8	5.4	.225	>100	

Comments:

Air Temp: 50's
Weather Conditions: rain

Crew Chief Signature E. Hollister Date: 3-7-00

R2-0000775

LMS Well Sampling Log

Date: 20-Apr-99
Crew: EH/DK
Job No: 650-422
Project: NCIA Well Sampling
Project Site: Merrilon

METERS USED
Temp.: TLC#8
pH: DEC 4-99-04
Cond.: TLC#8
Turb.: SN 19834

Well ID No.: NRMW-03
Well Condition: new
Well Depth/Diameter: 70.9 2
Well Casing Type: pvc
Screened Interval: bottom 10
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 40.11
Water Column Ht./Vol.: 30.79 13.8
Purge Est.: 41.5
Purge Method(s): grundfos
Purge Date/Time(s): 20-Apr-99 0900-0920

Depth(s): all
Rates (gpm): 2.5
Purged Volume: 50
DTW After Purging: 40.16
Yield Rate: H
Purge Observations:

DTW Before Sampling: 40.11
Sample Date/Time: 20-Apr 0930
Sampling Method: teflon bailer
Sampling Depth(s): toc
DTW After Sampling: 40.11
Chain-of-Custody No.(s):
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C	pH	Sp. Cond	Turb.
Start	14.7	6.6	.140	>100
End	14.6	7.1	.132	20

SAMPLE ANALYSES

Parameter	Inv. No.	Pres. Meth.	Filter
VOCs	50	<4°C	N

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.	
0	14.1	6.7	.137	>100	
10	14.6	6.6	.140	20	raised pump 4'
20	14.8	6.6	.138	>100	
30	14.8	6.7	.140	9	raised pump 5'
40	14.8	6.6	.140	~100	
50	14.7	6.6	.140	>100	

Comments:

Air Temp: 50's
Weather Conditions: rain

Crew Chief Signature E Hollrit Date: 8-7-00

LMS Well Sampling Log

Date:	20-Apr-99	METERS USED	
Crew:	EH/DK	Temp.:	TLC#8
Job No:	650-422	pH:	DEC 4-99-04
Project:	NCIA Well Sampling	Cond.:	TLC#8
Project Site:	Edgewood	Turb.:	SN 19834

Well ID No.: NRMW-4
Well Condition: new
Well Depth/Diameter: 70.6 2
Well Casing Type: pvc
Screened Interval: bottom 10
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 42.22
Water Column Ht./Vol.: 28.38 13.4
Purge Est.: 40.3
Purge Method(s): grundfos
Purge Date/Time(s): 20-Apr-99 1515-1535

Depth(s): all
Rates (gpm): 2.5
Purged Volume: >40
DTW After Purging: 42.22
Yield Rate: H
Purge Observations:
tan, silty
cleans up fast

DTW Before Sampling: 42.22
Sample Date/Time: 20-Apr 1545
Sampling Method: teflon bailer
Sampling Depth(s): toc
DTW After Sampling: 42.22
Chain-of-Custody No.(s):
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C	pH	Sp. Cond	Turb.
Start	14.3	6.0	.091	>100
End	14.2	6.9	.120	35

SAMPLE ANALYSES

Parameter	Inv. No.	Pres. Meth.	Filter
VOCs	54	<4°C	N

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.	
0	13.9	6.6	.107	>200	raised pump 5'
10	14.5	6.3	.093	>200	
20	14.5	6.4	.094	>100	raised pump 5'
30	14.4	6.1	.092	>200	raised pump 5'
40	14.3	6.0	.091	>100	

Comments:

Air Temp: 50's
Weather Conditions: rain

Crew Chief Signature EHollister Date: 3-7-00

R2-0000777

LMS Well Sampling Log

Date: 13-Apr
Crew: BSM / DK
Job No: 650-
Project: NCIA
Project Site: Rushmore St

METERS USED
Temp.:
pH:
Cond.:
Turb.:

Well ID No.:	NYT MW-3
Well Condition:	Good
Well Depth/Diameter:	63.3' / 4"
Well Casing Type:	PVC
Screened Interval:	10'
Casing Ht./Lock No.:	Flush
Reference Pt.:	Notch on PVC
Depth to Water (DTW):	51.01'
Water Column Ht./Vol.:	12.29' / ~30 gal
Purge Est.:	~60 gal
Purge Method(s):	Grundfos
Purge Date/Time(s):	4/13/99 / 1515
Depth(s):	~61'
Rates (gpm):	3 GPM
Purged Volume:	~60 gal
DTW After Purging:	
Yield Rate: L - M - H	
Purge Observations:	

DTW Before Sampling:	
Sample Date/Time:	4/13/99 / 1600
Sampling Method:	Bailer
Sampling Depth(s):	~61'
DTW After Sampling:	51.03'
Chain-of-Custody No.(s):	
Analytical Lab(s):	H2M
Sampling Observations:	

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	15.1	6.1	0.175	>200
End	14.9	6.2	0.175	30

SAMPLE ANALYSES

Parameters	Inv. No.	Pres.	Meth.	Filter

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
12	15.1	6.0	0.171	>200
24	15.1	6.0	0.17	>200
36	15.2	6.0	0.17	>200
48	15.2	6.0	0.172	200
60	15.2	5.9	0.171	90

Comments:

Air Temp: 60 Degrees
Weather Conditions: Sunny

Crew Chief Signature E Hallister

Date: 3-7-00 4/13/1999

Note:
Temperature is measured in Celsius
Turbidity is measured in NTU
Volume is measured in gallons

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LMS Well Sampling Log

Date:	13-Apr
Crew:	BSM / DK
Job No:	650-
Project:	NCIA
Project Site:	80 Swalm St

METERS USED

Temp.:

pH:

Cond.:

Turb.:

Well ID No.:	UN-16
Well Condition:	Good
Well Depth/Diameter:	70' / 4"
Well Casing Type:	PVC
Screened Interval:	10'
Casing Ht./Lock No.:	Flush
Reference Pt.:	Notch in PVC
Depth to Water (DTW):	51.00'
Water Column Ht./Vol.:	19' / ~25 gal
Purge Est.:	~75 gal
Purge Method(s):	Grundfos
Purge Date/Time(s):	4/13/99 / 1200
Depth(s):	~49'
Rates (gpm):	3 GPM
Purged Volume:	~75 gal
DTW After Purging:	51.01'

Yield Rate: L - M - H

Purge Observations:

DTW Before Sampling:	51.01'
Sample Date/Time:	4/13/99 / 1245
Sampling Method:	Bailer
Sampling Depth(s):	~49'
DTW After Sampling:	51.00'
Chain-of-Custody No.(s):	
Analytical Lab(s):	H2M

Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	14.6	5.9	0.39	150
End	15.4	5.7	0.374	12

SAMPLE ANALYSES

Parameters	Inv. No.	Pres.	Meth.	Filter

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
15	15.4	5.8	0.382	>200
30	15.4	5.7	0.381	150
45	15.5	5.7	0.382	55
60	15.5	5.9	0.381	10
75	15.4	5.7	0.382	6

Comments:

Air Temp: 60 Degrees

Weather Conditions: Sunny

Crew Chief Signature E Hallett

Date: 3-7-00 4/13/1999

Note:
Temperature is measured in Celsius
Turbidity is measured in NTU
Volume is measured in gallons

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R2-0000779

Table D-1
Well sampling list
April 1999

NYSDEC sample #	Well ID	date	time	sampler	NOTES
1	N-11862	12-Apr	1315	cjm	
2	N-10477	12-Apr	1450	cjm	
3	N-10479	12-Apr	1205	cjm	
4	N-9939	12-Apr	1055	cjm	
5	N-10478	12-Apr	1640	cjm	
6	Anson MW-8	12-Apr	1330	EH	
7	N-9938	12-Apr	1710	EH	
8	N-10322	12-Apr	1615	EH	
9	N-10470	13-Apr	945	EH	
10	N-10326	13-Apr	1320	EH	
11	N-11854	13-Apr	1545	EH	
12	N-11850	13-Apr	1015	BM	
13	UN-16	13-Apr	1245	BM	
14	N-10325	13-Apr	1145	BM	
15	N-10464	13-Apr	915	BM	
16	N-10465	13-Apr	1445	BM	
17	NYT MW-3	13-Apr	1600	BM	
18	N-11855	13-Apr	1420	SE	
19	N-10471	14-Apr	1000	EH	
20	N-10471	14-Apr	1000	EH	MS
21	N-10471	14-Apr	1000	EH	MSD
22	N-10329	14-Apr	1300	EH	with
23	N-92301	14-Apr	1300	SE	blind dup
24	N-10328	14-Apr	1640	SE	
25	N-10328	14-Apr	1640	SE	MS
26	N-10328	14-Apr	1640	SE	MSD
27	N-11858	14-Apr	1140	CJM	
28	N-11852	14-Apr	905	cjm	
29	N-11851	14-Apr	1000	cjm	
30	N-11849	14-Apr	1315	cjm	
31	N-10459	14-Apr	1455	cjm	
35	N-11848	14-Apr	1555	cjm	
99	NCRO-1	14-Apr	1415	SE	
32	FLMW-204B	15-Apr	930	EH	
33	FLMW-205B	15-Apr	1045	EH	
34	N-10327	15-Apr	1545	EH	with
38	N-72301	15-Apr	1545	cjm	blind dup
36	N-10476	15-Apr	1340	cjm	
37	N-10324	15-Apr	910	cjm	
39	N-10474	15-Apr	1020	cjm	
40	N-10475	15-Apr	1500	cjm	
41	N-10472	15-Apr	1625	cjm	
42	N-11860	16-Apr	0950	SE	
43	N-11861	16-Apr	1040	SE	
44	NE Hopper &	16-Apr	1300	SE	
45	EW-1B	16-Apr	1240	cjm	
46	EW-2B	16-Apr	1100	cjm	
47	N-10462	19-Apr	1415	EH	
48	N-11859	19-Apr	1525	EH	
49	EW-1C	19-Apr	1800	EH	
50	NRMW-03	20-Apr	930	EH	
51	NRMW-2	20-Apr	1030	EH	
52	NRMW-1	20-Apr	1145	EH	
53	N-10321	20-Apr	1445	EH	
54	NRMW-4	20-Apr	1545	EH	
55	EW-2C	21-Apr	1000	EH	
	Total number of wells sampled = 49				

MONITORING WELL SAMPLING LOGS
AUGUST 1999

LMS Well Sampling Log

Date: 09-Aug-99
Crew: E. HOLLISTER/D. KASSELL
Job No: 650-422
Project: NCIA WELL SAMPLING
Project Site: FLOWER

METERS USED	
Temp.:	DEC 560
pH:	DEC 4-99-03
Cond.:	DEC 560
Turb.:	DRT 15C s/n 19834

Well ID No.:	EW-1B	
Well Condition:	GOOD	
Well Depth/Diameter:	164.00	2
Well Casing Type:	PVC	
Screened Interval:	154-164	
Casing Ht./Lock No.:		
Reference Pt.:	TOC	
Depth to Water (DTW):	48.93	
Water Column Ht./Vol.:	115.07	27.6
Purge Est.:	83.00	
Purge Method(s):	GRUNDFOS	
Purge Date/Time(s):	09-Aug-99	
	17:25	18:00
Depth(s):	ALL	
Rates (gpm):	2.50	
Purged Volume:	90.00	
DTW After Purging:	48.93	
Yield Rate: L - M - H	H	

Purge Observations:

DTW Before Sampling:	48.93	
Sample Date/Time:	09-Aug-99	18:25
Sampling Method:	Teflon bailer	
Sampling Depth(s):	TOC	
DTW After Sampling:	48.93	
Chain-of-Custody No.(s):	04	
Analytical Lab(s):	H2M	

Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	17.2	6.6	277	3.7
End	18	6.6	252	42.3

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	18.3	7	242	14.1
20	17.6	6.9	277	11.4
40	17.3	6.7	277	6.4
60	17.3	6.6	277	6.1
80	17.4	6.5	276	4.1
90	17.2	6.6	277	3.7

Comments:

Air Temp: 80's
Weather Conditions: Sunny, slight breeze
Hot

Crew Cheif Signature E Hollister Date: 3-7-00

+Disk No.: DATA J:\HazWaste\JOBS\600\650-422 - NCIA well sampling\Well Sampling August\August Well sampling logs.xls EW-1B 3/2/2000 3:51:53 PM+

R2-0000782

LMS Well Sampling Log

Date: 09-Aug-99
Crew: E. HOLLISTER/D. KASSELL
Job No: 650-422
Project: NCIA WELL SAMPLING
Project Site: FLOWER

METERS USED

Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: DRT 15C s/n 19834

Well ID No.: EW-1C
Well Condition: GOOD
Well Depth/Diameter: ~500 4
Well Casing Type: CARBON STEEL
Screened Interval: BOTTOM 10'
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): ~50
Water Column Ht./Vol.: ~450/~306
Purge Est.: ~1000
Purge Method(s): DEDICATED PUMP
Purge Date/Time(s): 09-Aug-99
15:55 16:50
Depth(s):
Rates (gpm): 20
Purged Volume: >1000
DTW After Purging: 50
Yield Rate: L - M - **H** **H**
Purge Observations:

DTW Before Sampling: 50
Sample Date/Time: 09-Aug-99 16:50
Sampling Method: Teflon bailer
Sampling Depth(s): TOC
DTW After Sampling: 50
Chain-of-Custody No.(s): 03
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	14.6	7.9	105	21
End	14.6	7.9	106	20

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	17.2	10	166	31.0
200	15.5	9.3	117	34.2
400	14.8	8.2	108	>200
600	14.9	8.2	108	47.1
800	14.8	8.2	106	24.0
1000	14.6	7.9	105	21.0

Comments:

Air Temp: 80's
Weather Conditions: Sunny, slight breeze
Hot

Crew Cheif Signature E Hollister

3-7-00
Date: 09-Aug-99

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls EW-1C 10/4/99 8:12:44 AM+

R2-0000783

LMS Well Sampling Log

Date:	09-Aug-99	**METERS USED**	
Crew:	E. HOLLISTER/D. KASSELL	Temp.:	DEC 560
Job No:	650-422	pH:	DEC 4-99-03
Project:	NCIA WELL SAMPLING	Cond.:	DEC 560
Project Site:	ASTER	Turb.:	DRT 15C s/n 19834

Well ID No.:	EW-2B		DTW Before Sampling:	49.84
Well Condition:	good		Sample Date/Time:	09-Aug-99 15:25
Well Depth/Diameter:	142.00	2	Sampling Method:	Teflon bailer
Well Casing Type:	PVC		Sampling Depth(s):	TOC
Screened Interval:	BOTTOM 10'		DTW After Sampling:	49.84
Casing Ht./Lock No.:			Chain-of-Custody No.(s):	02
Reference Pt.:	TOC		Analytical Lab(s):	H2M
Depth to Water (DTW):	49.84		Sampling Observations:	
Water Column Ht./Vol.:	92.16	23.9		
Purge Est.:	72.00			
Purge Method(s):	GRUNDFOS			
Purge Date/Time(s):	09-Aug-99 14:15-15:00			
Depth(s):	ALL			
Rates (gpm):	2.00			
Purged Volume:	75.00			
DTW After Purging:	49.84			
Yield Rate: L - **M** - H	**M**			
Purge Observations:				

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	17.6	6.6	252	5.1
End	18.7	6.6	267	25.3

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	18.3	6.9	257	70.1
15	17.4	6.8	258	21.2
30	17.4	6.6	254	5.1
45	17.5	6.6	251	4.7
60	17.5	6.6	252	4.2
75	17.6	6.6	252	5.1

Comments:

Air Temp: 80's
Weather Conditions: Sunny, slight breeze
Hot

Crew Cheif Signature E Hollister Date: 3-7-00 09-Aug-99

•Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls EW-2B 10/4/99 8:12:52 AM•

LMS Well Sampling Log

Date:	09-Aug-99
Crew:	E. HOLLISTER/D. KASSELL
Job No:	650-422
Project:	NCIA WELL SAMPLING
Project Site:	ASTER

METERS USED

Temp.:	DEC 560
pH:	DEC 4-99-03
Cond.:	DEC 560
Turb.:	DRT 15C s/n 19834

Well ID No.:	EW-2C
Well Condition:	GOOD
Well Depth/Diameter:	~500/4
Well Casing Type:	CARBON STEEL
Screened Interval:	BOTTOM 10'
Casing Ht./Lock No.:	
Reference Pt.:	TOC
Depth to Water (DTW):	~50
Water Column Ht./Vol.:	~450/~306
Purge Est.:	~1000
Purge Method(s):	DEDICATED PUMP
Purge Date/Time(s):	09-Aug-99 12:15-13:05
Depth(s):	
Rates (gpm):	20.00
Purged Volume:	>1000
DTW After Purging:	50.00
Yield Rate: L - M - **H**	**H**
Purge Observations:	

DTW Before Sampling:	50
Sample Date/Time:	09-Aug-99 13:45
Sampling Method:	DEDICATED TUBING
Sampling Depth(s):	TOC
DTW After Sampling:	50
Chain-of-Custody No.(s):	01
Analytical Lab(s):	H2M
Sampling Observations:	

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	15.5	8.2	58	29.6
End	15.1	8.2	57	21.4

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCL	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	16.8	10.3	115	25.3
200	15.2	10.1	103	15.0
400	14.7	9.9	94	62.4
600	14.2	8.5	65	>200
800	14.2	8.5	62	>100
1000	14.3	8.3	59	38.4

Comments:

Air Temp: 80's
Weather Conditions: Sunny, slight breeze
Hot

Crew Cheif Signature E Hollister

Date: 3-7-00 09-Aug-99

•Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls EW-2C 10/4/99 8:12:58 AM•

R2-0000785

LMS Well Sampling Log

Date: 10-Aug-99
Crew: E. HOLLISTER/D. KASSELL
Job No: 650-422
Project: NCIA WELL SAMPLING
Project Site: 675 Brooklyn

METERS USED
Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: DRT 15C s/n 19834

Well ID No.: N-9938
Well Condition: FAIR
Well Depth/Diameter: 70.56 4
Well Casing Type: PVC
Screened Interval: Bottom 5 + 3
Casing Ht./Lock No.: sump
Reference Pt.: TOC
Depth to Water (DTW): 55.56
Water Column Ht./Vol.: 15.00 20.1
Purge Est.: 60.00
Purge Method(s): GRUNDFOS
Purge Date/Time(s): 10-Aug-99
15:00 15:30
Depth(s): ALL
Rates (gpm): 2.00
Purged Volume: 60.00
DTW After Purging: 55.60
Yield Rate: L - M - H **H**
Purge Observations:

DTW Before Sampling: 55.6
Sample Date/Time: 10-Aug-99 15:45
Sampling Method: Teflon bailer
Sampling Depth(s): TOC
DTW After Sampling: 55.6
Chain-of-Custody No.(s): 10-13
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	17.7	5.4	426	4.2
End	18.8	5.9	352	14

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	19.1	5.4	467	>100
10	17.9	5.6	428	91.7
20	17.9	5.4	426	5.4
30	17.6	5.4	427	4.7
40	17.7	5.4	423	4.7
50	17.7	5.6	424	10.0
60	17.7	5.4	426	4.20

Comments:
BLIND DUP N-9937
MS/MSD

Air Temp: 80s HOT, HUMID, SLIGHT BREEZE
Weather Conditions:

Crew Cheif Signature E Hollister Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls N-9938 10/4/99 8:29:52 AM+

LMS Well Sampling Log

Date: 10-Aug-99
Crew: E. HOLLISTER/D. KASSELL
Job No: 650-422
Project: NCIA WELL SAMPLING
Project Site: LAND LANE

METERS USED

Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: DRT 15C s/n 19834

Well ID No.: N-9939
Well Condition: GOOD
Well Depth/Diameter: 77.00 4
Well Casing Type: PVC Sch 80
Screened Interval: BOTTOM 5'
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 43.00
Water Column Ht./Vol.: 34.00 29.4
Purge Est.: 88.00
Purge Method(s): GRUNDFOS
Purge Date/Time(s): 10-Aug-99 8:05 8:43
Depth(s): ALL
Rates (gpm): 2.50
Purged Volume: 90.00
DTW After Purging: 43.00
Yield Rate: L - M - H H
Purge Observations:

DTW Before Sampling: 43.00
Sample Date/Time: 10-Aug-99 9:00
Sampling Method: Teflon bailer
Sampling Depth(s): TOC
DTW After Sampling: 43.00
Chain-of-Custody No.(s): 05
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	15	5	377	3.5
End	14.9	5.1	316	16

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	16.2	5.6	377	30.1
15	15.4	5.4	376	17.1
30	15.2	5.2	376	9.4
45	15.2	5.1	376	5.7
60	15	5	377	4.7
75	15	5	377	4.1
90	15	5	377	3.5

Air Temp: 70
Weather Conditions:

Comments:

Crew Cheif Signature E Hollister Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls N-9939 10/4/99 8:13:13 AM+

R2-0000787

LMS Well Sampling Log

Date: 18-Aug-99
Crew: B. CAR / J. PFAFF
Job No: 650-422
Project: NCIA WELL SAMPLING
Project Site: NY AVE (ADCHEM)

METERS USED

Temp.: TLC #10
pH: N-3
Cond.: TLC #10
Turb.: NYSDEC MONITEK S/N L-3324

Well ID No.: N-10321
Well Condition: FAIR
Well Depth/Diameter: 61.20 2
Well Casing Type: PVC
Screened Interval: BOTTOM 10'
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 55.30
Water Column Ht./Vol.: 5.90 5.3
Purge Est.: 15.90
Purge Method(s): Submersible pump
Purge Date/Time(s): 18-Aug-99 15:25 15:51
Depth(s): ALL
Rates (gpm): 1.00
Purged Volume: 20.00
DTW After Purging: 55.39
Yield Rate: L - M - H L
Purge Observations:

DTW Before Sampling: 55.39
Sample Date/Time: 18-Aug-99 16:00
Sampling Method: Teflon bailer
Sampling Depth(s): TOC
DTW After Sampling: 55.39
Chain-of-Custody No.(s): 38
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	18	5.4	325	1.7
End	18.9	6.1	306	65

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	22.2	5.9	346	>200
5	18.5	5.3	325	25.0
10	17.9	5.4	322	5.4
15	17.5	5.4	327	2.8
20	18	5.4	325	1.7

Comments:

Air Temp: 70s
Weather Conditions: HOT, HAZY, HUMID

Crew Cheif Signature E Hallet Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1 xls N-10321 10/4/99 8:14:22 AM+

R2-0000788

LMS Well Sampling Log

Date:	23-Aug-99	**METERS USED**	
Crew:	E. HOLLISTER/D. KASSELL	Temp.:	DEC 560
Job No:	650-422	pH:	DEC 4-99-03
Project:	NCIA WELL SAMPLING	Cond.:	DEC 560
Project Site:	BOND & SUMMA	Turb.:	DRT 15C s/n 19834

Well ID No.:	N-10322		DTW Before Sampling:	56.5
Well Condition:	POOR		Sample Date/Time:	23-Aug-99 17:45
Well Depth/Diameter:	64.00	2	Sampling Method:	Teflon bailer
Well Casing Type:	PVC		Sampling Depth(s):	TOC
Screened Interval:	BOTTOM 10'		DTW After Sampling:	56.5
Casing Ht./Lock No.:			Chain-of-Custody No.(s):	59
Reference Pt.:	TOC		Analytical Lab(s):	H2M
Depth to Water (DTW):	56.25		Sampling Observations:	
Water Column Ht./Vol.:	7.75	7		
Purge Est.:	20.90			
Purge Method(s):	Submersible pump			
Purge Date/Time(s):	23-Aug-99			
	17:08	17:30		
Depth(s):	bottom			
Rates (gpm):	1.00			
Purged Volume:	21.00			
DTW After Purging:	56.55			
Yield Rate: L - M - H	**M**			
Purge Observations:				

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	16.9	5.5	260	4
End	16.9	5.8	296	>100

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	18.8	5.9	281	>100
5	17.2	5.6	251	16.0
10	16.7	5.4	262	6.0
15	16.7	5.8	263	4.0
21	16.9	5.5	260	4.0

Comments:

Air Temp: 80s

Weather Conditions: HOT, HUMID, SUNNY

Crew Cheif Signature E. Hollister Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls N-10322 10/4/99 8:14:30 AM+

R2-0000789

LMS Well Sampling Log

Date: 13-Aug-99
Crew: E. HOLLISTER/D. KASSELL
Job No: 650-422
Project: NCIA WELL SAMPLING
Project Site: Magnolia and Grand

METERS USED
Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: DRT 15C s/n 19834

Well ID No.: N-10324
Well Condition: FAIR
Well Depth/Diameter: 57.00 2
Well Casing Type: PVC
Screened Interval: 47-57
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 50.65
Water Column Ht./Vol.: 6.35 5.7
Purge Est.: 17.10
Purge Method(s): teflon bailer
Purge Date/Time(s): 13-Aug-99
8:25 9:01
Depth(s): ALL
Rates (gpm): 0.50
Purged Volume: 18.00
DTW After Purging: 51.00
Yield Rate: L - M - H H
Purge Observations:
lots of organic debris floating
much fine sand and silt

DTW Before Sampling: 51
Sample Date/Time: 13-Aug-99 10:00
Sampling Method: Teflon bailer
Sampling Depth(s): TOC
DTW After Sampling: 51
Chain-of-Custody No.(s): 18
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	17.6	6.6	342	18
End	17	6.5	334	15

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	18.1	6.7	569	>100
3	17	6.5	360	>100
6	16.2	6.4	336	>100
9	18	6.4	334	>100
12	17.4	6.2	337	16.5
15	18.1	6.1	326	16.0
18	17.6	6.6	342	18.0

Air Temp: High 70s
Weather Conditions: hot, hazy, HUMID

Comments:

Blind dup N-10323 taken here called 8/12/99 17:00

Crew Cheif Signature E Hollister Date: 8-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls N-10324 10/4/99 8:14:37 AM+

R2-0000790

LMS Well Sampling Log

Date: 20-Aug-99
Crew: B. CAR / J. PFAFF
Job No: 650-422
Project: NCIA WELL SAMPLING
Project Site: SWALM

METERS USED
Temp.: TLC #10
pH: N-3
Cond.: TLC #10
Turb.: NYSDEC MONITEK S/N L-3324

Well ID No.: N-10325
Well Condition: GOOD
Well Depth/Diameter: 55.30
Well Casing Type: PVC
Screened Interval: BOTTOM 10'
Casing Ht./Lock No.: FLUSH
Reference Pt.: TOC
Depth to Water (DTW): 52.17
Water Column Ht./Vol.: 3.13 2.8
Purge Est.: 8.40
Purge Method(s): Submersible pump
Purge Date/Time(s): 20-Aug-99
11:35 12:05
Depth(s): ALL
Rates (gpm): 0.33
Purged Volume: 8.00
DTW After Purging: 52.25
Yield Rate: L - M - H **M**
Purge Observations:

DTW Before Sampling: 52.25
Sample Date/Time: 20-Aug-99 12:08
Sampling Method: Teflon bailer
Sampling Depth(s): TOC
DTW After Sampling: 52.25
Chain-of-Custody No.(s): 52
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	19.3	6.3	143	0.6
End	18.3	6.2	153	36

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	20.8	6.1	166	>200
2	18.2	6.3	157	6.5
4	17.9	6.3	141	4.5
6	19.8	6.3	154	0.8
8	19.3	6.3	143	0.6

Comments:
ACROSS STREET AND SOUTH OF 80 SWALM

Air Temp: 70s
Weather Conditions: OVERCAST

Crew Cheif Signature E Hollister Date: 3-7-00

•Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls N-10325 10/4/99 8:14:44 AM•

R2-0000791

LMS Well Sampling Log

Date:	19-Aug-99	METERS USED	
Crew:	B. CAR / J. PFAFF	Temp.:	TLC #10
Job No:	650-422	pH:	N-3
Project:	NCIA WELL SAMPLING	Cond.:	TLC #10
Project Site:	58 SYLVESTER	Turb.:	NYSDEC MONITEK S/N L-3324

Well ID No.: N-10326
Well Condition: FAIR
Well Depth/Diameter: 57.20 2
Well Casing Type: PVC
Screened Interval: BOTTOM 10'
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 53.81
Water Column Ht./Vol.: 3.39 3
Purge Est.: 9.10
Purge Method(s): Submersible pump
Purge Date/Time(s): 19-Aug-99 10:05 10:25
Depth(s): all
Rates (gpm): 1.00
Purged Volume: 20.00
DTW After Purging: 53.81
Yield Rate: L - M - H H
Purge Observations:

DTW Before Sampling: 53.81
Sample Date/Time: 19-Aug-99 10:40
Sampling Method: Teflon bailer
Sampling Depth(s): TOC
DTW After Sampling: 53.81
Chain-of-Custody No.(s): 44
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	17.8	6	236	38
End	18.1	5.8	247	>100

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	18.1	6.1	232	>200
5	17.2	5.9	234	>200
10	17.8	5.9	240	22.0
15	17.7	5.9	239	40.0
20	17.8	6	236	38.0

Comments:

Air Temp: 70-80s
Weather Conditions: HOT, HAZY, HUMID

Crew Cheif Signature E Hollister Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls N-10326 10/4/99 10:39:08 AM+

LMS Well Sampling Log

Date:	20-Aug-99		**METERS USED**
Crew:	B. CAR / J. PFAFF	Temp.:	TLC #10
Job No:	650-422	pH:	N-3
Project:	NCIA WELL SAMPLING	Cond.:	TLC #10
Project Site:	URBAN	Turb.:	NYSDEC MONITEK S/N L-3324

Well ID No.:	N-10327		DTW Before Sampling:	52.62	
Well Condition:	POOR		Sample Date/Time:	20-Aug-99	8:55
Well Depth/Diameter:	54.95	2	Sampling Method:	Teflon bailer	
Well Casing Type:	PVC		Sampling Depth(s):	TOC	
Screened Interval:	BOTTOM 10'		DTW After Sampling:	52.62	
Casing Ht./Lock No.:			Chain-of-Custody No.(s):	50	
Reference Pt.:	TOC		Analytical Lab(s):	H2M	
Depth to Water (DTW):	52.62		Sampling Observations:		
Water Column Ht./Vol.:	2.33	2.1			
Purge Est.:	6.30				
Purge Method(s):	Submersible pump				
Purge Date/Time(s):	20-Aug-99				
	8:15	8:50			
Depth(s):	ALL				
Rates (gpm):	0.25				
Purged Volume:	8.00				
DTW After Purging:	52.62				
Yield Rate: L - M - H	L				
Purge Observations:					

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	18.2	5.5	653	0.9
End	18.2	6.2	640	>200

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	17.8	6.5	354	>200
2	118	5.9	602	35.0
4	18.4	5.7	625	4.0
6	17.9	5.6	639	3.0
8	18.2	5.5	653	0.9

Comments:

CATCHES RUNOFF FROM CARWASH LOT

Air Temp: 70s

Weather Conditions: OVERCAST

Crew Cheif Signature E. Hollister Date: 3-7-00

+Disk No : C:\My Documents\2nd round Well sampling SAMPLE list1.xls N-10327 10/4/99 10:39:50 AM+

R2-0000793

LMS Well Sampling Log

Date: 19-Aug-99
Crew: B. CAR / J. PFAFF
Job No: 650-422
Project: NCIA WELL SAMPLING
Project Site: 979 OCR (NY AVE)

METERS USED
Temp.: TLC #10
pH: N-3
Cond.: TLC #10
Turb.: NYSDEC MONITEK S/N L-3324

Well ID No.: N-10328
Well Condition: FAIR
Well Depth/Diameter: 53.80 2
Well Casing Type: PVC
Screened Interval: BOTTOM 10'
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 50.95
Water Column Ht./Vol.: 2.85 2.6
Purge Est.: 7.70
Purge Method(s): Submersible pump
Purge Date/Time(s): 19-Aug-99
7:50 8:40
Depth(s): all
Rates (gpm): 0.25
Purged Volume: 12.00
DTW After Purging: 50.95
Yield Rate: L - M - H L
Purge Observations:

DTW Before Sampling: 50.95
Sample Date/Time: 19-Aug-99 8:50
Sampling Method: Teflon bailer
Sampling Depth(s): TOC
DTW After Sampling: 50.95
Chain-of-Custody No.(s): 43
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	20.5	6.3	86	8.5
End	19.2	6.2	179	>200

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	19.8	6.4	182	>200
4	19.3	6.3	169	29.0
8	19.3	6.5	163	45.0
12	20.5	6.3	86	8.5

Comments:

Air Temp: 70-80s
Weather Conditions: HOT, HAZY, HUMID

Crew Cheif Signature E Hollist Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls N-10328 10/4/99 8:15:37 AM+

R2-0000794

LMS Well Sampling Log

Date:	12-Aug-99	**METERS USED**	
Crew:	E. HOLLISTER/D. KASSELL	Temp.:	DEC 560
Job No:	650-422	pH:	DEC 4-99-03
Project:	NCIA WELL SAMPLING	Cond.:	DEC 560
Project Site:	median Hyacinth	Turb.:	DRT 15C s/n 19834

Well ID No.:	N-10329		DTW Before Sampling:	53.35
Well Condition:	fair		Sample Date/Time:	12-Aug-99 13:50
Well Depth/Diameter:	56.00	2	Sampling Method:	Teflon bailer
Well Casing Type:	PVC		Sampling Depth(s):	TOC
Screened Interval:	BOTTOM 10'		DTW After Sampling:	53.35
Casing Ht./Lock No.:			Chain-of-Custody No.(s):	15
Reference Pt.:	TOC		Analytical Lab(s):	H2M
Depth to Water (DTW):	53.35		Sampling Observations:	
Water Column Ht./Vol.:	2.65	2.4		
Purge Est.:	7.10			
Purge Method(s):	Teflon bailer			
Purge Date/Time(s):	12-Aug-99			
	12:45	13:35		
Depth(s):	all			
Rates (gpm):	2.00			
Purged Volume:	8.00			
DTW After Purging:	53.35			
Yield Rate: L - M - H	**M**			
Purge Observations:	very silty			

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	15.1	5.4	893	>200
End	18.2	5.4	884	>200

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	18.2	5.1	1120	>200
2	18.2	5.3	961	>200
4	18.2	5.5	912	>200
6	18	5.4	903	>200
8	15.1	5.4	893	>200

Comments:

Air Temp:

Weather Conditions:

Crew Cheif Signature E Hollister Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls N-10329 10/4/99 10:40:05 AM+

R2-0000795

LMS Well Sampling Log

Date:	12-Aug-99	METERS USED	
Crew:	E. HOLLISTER/D. KASSELL	Temp.:	DEC 560
Job No:	650-422	pH:	DEC 4-99-03
Project:	NCIA WELL SAMPLING	Cond.:	DEC 560
Project Site:	Westbury water district inside fence	Turb.:	DRT 15C s/n 19834

Well ID No.:	N-10459		DTW Before Sampling:	58.40
Well Condition:	GOOD		Sample Date/Time:	12-Aug-99 11:50
Well Depth/Diameter:	68.00	2	Sampling Method:	Teflon bailer
Well Casing Type:	PVC		Sampling Depth(s):	TOC
Screened Interval:	58-68		DTW After Sampling:	58.40
Casing Ht./Lock No.:			Chain-of-Custody No.(s):	14
Reference Pt.:	TOC		Analytical Lab(s):	H2M
Depth to Water (DTW):	58.40		Sampling Observations:	
Water Column Ht./Vol.:	9.60	8.6		
Purge Est.:	30.00			
Purge Method(s):	GRUNDFOS			
Purge Date/Time(s):	12-Aug-99 11:08	11:23		
Depth(s):	ALL			
Rates (gpm):	2.00			
Purged Volume:	30.00			
DTW After Purging:	58.40			
Yield Rate: L - M - H	**M**			

Purge Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	16.6	4.4	234	>200
End	16.6	4.5	230	>100

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.	
0	18.1	4.9	151	>200	
5	16.8	5	166	>200	went dry after ~8 gallons. Let sit few minutes to recover
10	17.2	4.9	200	>200	
15	16.7	4.8	207	>200	
20	16.6	4.7	220	>200	
25	16.7	4.54	229	>200	
30	16.6	4.4	234	>200	Air Temp: 80s

Comments:

Westbury water district
516-333-0427
for access inside fence

Weather Conditions: clearing up, nice breeze
hot, humid

Crew Cheif Signature E. Hollister Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls N-10459 10/4/99 8:16:48 AM+

LMS Well Sampling Log

Date: 12-Aug-99
Crew: E. HOLLISTER/D. KASSELL
Job No: 650-422
Project: NCIA WELL SAMPLING
Project Site: railroad

METERS USED

Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: DRT 15C s/n 19834

Well ID No.:	N-10462	
Well Condition:	poor	
Well Depth/Diameter:	63.40	1.9999
Well Casing Type:	PVC	
Screened Interval:	BOTTOM 10'	
Casing Ht./Lock No.:		
Reference Pt.:	TOC	
Depth to Water (DTW):	54.35	
Water Column Ht./Vol.:	9.05	8.1
Purge Est.:	24.40	
Purge Method(s):	GRUNDFOS	
Purge Date/Time(s):	12-Aug-99	
	15:05	15:15
Depth(s):	all	
Rates (gpm):	2.00	
Purged Volume:	30.00	
DTW After Purging:	54.35	
Yield Rate: L - M - H	H	

Purge Observations:

DTW Before Sampling:	54.35	
Sample Date/Time:	12-Aug-99	15:40
Sampling Method:	Teflon bailer	
Sampling Depth(s):	TOC	
DTW After Sampling:	54.35	
Chain-of-Custody No.(s):	16	
Analytical Lab(s):	H2M	

Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	16.9	6.1	345	37.1
End	18.4	6.2	321	>200

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	19.7	6	287	>200
6	17.2	6	141	>200
12	16.8	6.1	335	>100
18	16.9	6	337	>100
24	16.9	6.1	341	41.0
30	16.9	6.1	345	37.1

Air Temp:

Weather Conditions:

Comments:

Surrounding manhole is not in good condition, missing cover, but has well cap.

Crew Cheif Signature E Hollister

Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls N-10462 10/4/99 8:16:58 AM+

LMS Well Sampling Log

Date: 23-Aug-99
Crew: E. HOLLISTER/D. KASSELL
Job No: 650-422
Project: NCIA WELL SAMPLING
Project Site: Garden and Grand

METERS USED
Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: DRT 15C s/n 19834

Well ID No.: N-10464
Well Condition: GOOD
Well Depth/Diameter: 60.00 2
Well Casing Type: PVC
Screened Interval: BOTTOM 10'
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 50.47
Water Column Ht./Vol.: 9.53 8.6
Purge Est.: 25.70
Purge Method(s): Submersible pump
Purge Date/Time(s): 23-Aug-99
13:45 14:15
Depth(s): BOTTOM
Rates (gpm): 1.00
Purged Volume: 26.00
DTW After Purging: 50.49
Yield Rate: L - M - H H
Purge Observations:
PINKISH - WHITE ZINFINDELISH

DTW Before Sampling: 50.47
Sample Date/Time: 23-Aug-99 14:35
Sampling Method: Teflon bailer
Sampling Depth(s): TOC
DTW After Sampling: 50.47
Chain-of-Custody No.(s): 57
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	17.5	5.6	94	3
End	18.4	5.9	106	>100

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	18.8	6	115	>100
5	17.7	6	96	7.0
10	17.2	5.5	97	4.0
15	17.3	6	94	3.0
20	17.4	5.7	96	3.0
26	17.5	5.6	94	3.0

Comments:

Air Temp: 80s
Weather Conditions: HOT, SUNNY, HUMID

Crew Cheif Signature E Hollister Date: 3-2-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls N-10464 10/4/99 8 17:07 AM+

LMS Well Sampling Log

Date:	23-Aug-99	METERS USED	
Crew:	E. HOLLISTER/D. KASSELL	Temp.:	DEC 560
Job No:	650-422	pH:	DEC 4-99-03
Project:	NCIA WELL SAMPLING	Cond.:	DEC 560
Project Site:	80 RUSHMORE	Turb.:	DRT 15C s/n 19834

Well ID No.:	N-10465		DTW Before Sampling:	53.45
Well Condition:	GOOD		Sample Date/Time:	23-Aug-99 16:00
Well Depth/Diameter:	62.00	2	Sampling Method:	Teflon bailer
Well Casing Type:	PVC		Sampling Depth(s):	TOC
Screened Interval:	BOTTOM 10'		DTW After Sampling:	53.45
Casing Ht./Lock No.:			Chain-of-Custody No.(s):	58
Reference Pt.:	TOC		Analytical Lab(s):	H2M
Depth to Water (DTW):	53.45		Sampling Observations:	
Water Column Ht./Vol.:	8.55	7.7		
Purge Est.:	23.00			
Purge Method(s):	Submersible pump			
Purge Date/Time(s):	23-Aug-99			
	15:20	15:43		
Depth(s):	BOTTOM			
Rates (gpm):	1.00			
Purged Volume:	23.00			
DTW After Purging:	53.45			
Yield Rate: L - M - H	**H**			
Purge Observations:				

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	17.8	6.2	188	6
End	18.3	6.4	193	>100

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	21.3	6	321	>200
5	18	6	232	13.0
10		MISSED		
15	18	6.2	197	19.0
23	17.8	6.2	188	6.0

Comments:
ODORS FROM AUTOBODY ACCROSS STREET - POSSIBLY PAINT.

Air Temp: 80s
Weather Conditions: SUNNY, HOT, HUMID

Crew Cheif Signature E Hollister Date: 3-2-00

•Disk No : C:\My Documents\2nd round Well sampling SAMPLE list1.xls N-10465 10/4/99 8:17:13 AM•

R2-0000799

LMS Well Sampling Log

Date: 19-Aug-99
Crew: E. HOLLISTER/D. KASSELL
Job No: 650-422
Project: NCIA WELL SAMPLING
Project Site: 17 BROOKLYN

METERS USED

Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: DRT 15C s/n 19834

Well ID No.: N-10470
Well Condition: GOOD
Well Depth/Diameter: 64.90 2
Well Casing Type: PVC
Screened Interval: BOTTOM 10'
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 52.25
Water Column Ht./Vol.: 12.65 10.9
Purge Est.: 32.60
Purge Method(s): GRUNDFOS
Purge Date/Time(s): 19-Aug-99 10:45 11:02
Depth(s): ALL
Rates (gpm): 2.00
Purged Volume: 34.00
DTW After Purging: 52.25
Yield Rate: L - M - H H
Purge Observations:

DTW Before Sampling: 52.25
Sample Date/Time: 19-Aug-99 11:25
Sampling Method: Teflon bailer
Sampling Depth(s): TOC
DTW After Sampling: 52.25
Chain-of-Custody No.(s): 42
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	17.1	6	335	9
End	18.1	6.1	389	>100

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	18.9	6	426	>200
6	17.1	5.9	383	57.0
12	17	6	362	18.2
18	17.1	5.9	348	15.0
24	17.1	5.8	340	11.0
34	17.1	6	335	9.0

Comments:

Air Temp: 70-80s
Weather Conditions: HOT, HAZY, HUMID

Crew Cheif Signature E. Hollister Date: 3-2-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls N-10470 10/4/99 8:17:17 AM+

LMS Well Sampling Log

Date:	20-Aug-99	**METERS USED**	
Crew:	E. HOLLISTER/D. KASSELL	Temp.:	DEC 560
Job No:	650-422	pH:	DEC 4-99-03
Project:	NCIA WELL SAMPLING	Cond.:	DEC 560
Project Site:	58 STATE	Turb.:	DRT 15C s/n 19834

Well ID No.:	N-10471D		DTW Before Sampling:	50.80	
Well Condition:	POOR		Sample Date/Time:	20-Aug-99	9:00
Well Depth/Diameter:	104.25	2	Sampling Method:	Teflon bailer	
Well Casing Type:	PVC		Sampling Depth(s):	TOC	
Screened Interval:	BOTTOM 10'		DTW After Sampling:	50.80	
Casing Ht./Lock No.:			Chain-of-Custody No.(s):	48	
Reference Pt.:	TOC		Analytical Lab(s):	H2M	
Depth to Water (DTW):	50.80		Sampling Observations:		
Water Column Ht./Vol.:	53.45	17.5			
Purge Est.:	52.60				
Purge Method(s):	GRUNDFOS				
Purge Date/Time(s):	20-Aug-99				
	8:16	8:42			
Depth(s):	ALL				
Rates (gpm):	2.00				
Purged Volume:	55.00				
DTW After Purging:	50.80				
Yield Rate: L - M - H	H				
Purge Observations:					

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	16.4	6.1	205	14
End	16.7	6.2	67	61

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	17.6	6.7	49	19.1
11	16.4	6.4	183	50.2
22	16.6	6.4	191	91.0
33	16.4	5.9	198	30.0
44	16.4	5.8	202	17.2
55	16.4	6.1	205	14.0

Comments:

Air Temp: 70s

Weather Conditions: OVERCAST

Crew Cheif Signature E Hollister Date: 3-7-00

LMS Well Sampling Log

Date:	20-Aug-99	**METERS USED**	
Crew:	E. HOLLISTER/D. KASSELL	Temp.:	DEC 560
Job No:	650-422	pH:	DEC 4-99-03
Project:	NCIA WELL SAMPLING	Cond.:	DEC 560
Project Site:	58 STATE	Turb.:	DRT 15C s/n 19834

Well ID No.:	N-10471S		DTW Before Sampling:	50.84	
Well Condition:	POOR		Sample Date/Time:	20-Aug-99	10:23
Well Depth/Diameter:	57.35	2	Sampling Method:	Teflon bailer	
Well Casing Type:	PVC		Sampling Depth(s):	TOC	
Screened Interval:	BOTTOM 10'		DTW After Sampling:	50.84	
Casing Ht./Lock No.:			Chain-of-Custody No.(s):	49	
Reference Pt.:	TOC		Analytical Lab(s):	H2M	
Depth to Water (DTW):	50.73		Sampling Observations:		
Water Column Ht./Vol.:	6.62	5.9			
Purge Est.:	17.80				
Purge Method(s):	Teflon bailer				
Purge Date/Time(s):	20-Aug-99				
	8:30	10:18			
Depth(s):	ALL				
Rates (gpm):	~.25				
Purged Volume:	18.00				
DTW After Purging:	50.84				
Yield Rate: L - M - H	**M-H**				
Purge Observations:	VERY SILTY				

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	16.8	5.8	365	>100
End	16.6	5.8	351	>100

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	16.1	5.5	405	>200
4	16	5.8	393	>200
8	16.6	5.6	381	>200
12	16.6	5.6	381	>200
18	16.8	5.8	365	>100

Comments:

Air Temp: 70s
Weather Conditions: OVERCAST

Crew Cheif Signature E Hollister Date: 8-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls N-10471S 10/4/99 8:17:25 AM+

R2-0000802

LMS Well Sampling Log

Date: 13-Aug-99
Crew: E. HOLLISTER/D. KASSELL
Job No: 650-422
Project: NCIA WELL SAMPLING
Project Site: Water supply wells area

METERS USED
Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: DRT 15C s/n 19834

Well ID No.: N-10472
Well Condition: GOOD
Well Depth/Diameter: 62.00 2
Well Casing Type: SCH 80 PVC
Screened Interval: 52-62
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 46.30
Water Column Ht./Vol.: 15.70 11.4
Purge Est.: 34.10
Purge Method(s): GRUNDFOS
Purge Date/Time(s): 13-Aug-99
11:30 11:48
Depth(s): ALL
Rates (gpm): 2.00
Purged Volume: 36.00
DTW After Purging: 46.50
Yield Rate: L - M - H **M**
Purge Observations:
VERY silty

DTW Before Sampling: 46.50
Sample Date/Time: 13-Aug-99 12:10
Sampling Method: Teflon bailer
Sampling Depth(s): TOC
DTW After Sampling: 46.50
Chain-of-Custody No.(s): 19
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	17.2	5	236	>100
End	16.7	5.4	224	>100

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.	
0	18	6.2	249	>200	pump problems
6	20.1	5.3	263	>200	
12	18.2	5.4	258	>200	
18	18.1	5.2	247	>200	
24	17.9	5.1	242	>200	
30	17.6	4.9	247	>200	started to clear up a little
36	17.2	5	236	>100	

Comments:

Air Temp:
Weather Conditions: VERY HUMID, slight breeze

Crew Cheif Signature E. Hollister Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls N-10472 10/4/99 8:29:18 AM+

LMS Well Sampling Log

Date: 16-Aug-99
Crew: E. HOLLISTER/D. KASSELL
Job No: 650-422
Project: NCIA WELL SAMPLING
Project Site:

METERS USED

Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: DRT 15C s/n 19834

Well ID No.:	N-10474	
Well Condition:	FAIR	
Well Depth/Diameter:	60.00	2
Well Casing Type:	PVC SCH 80	
Screened Interval:	50-60	
Casing Ht./Lock No.:		
Reference Pt.:	TOC	
Depth to Water (DTW):	49.67	
Water Column Ht./Vol.:	10.33	9.3
Purge Est.:	27.80	
Purge Method(s):	GRUNDFOS	
Purge Date/Time(s):	16-Aug-99	
	11:30	11:40
Depth(s):	ALL	
Rates (gpm):	3.00	
Purged Volume:	30.00	
DTW After Purging:	49.67	
Yield Rate: L - M - H	H	

Purge Observations:

STARTED VERY SILTY, BROWN

DTW Before Sampling:	49.67	
Sample Date/Time:	16-Aug-99	12:10
Sampling Method:	Teflon bailer	
Sampling Depth(s):	TOC	
DTW After Sampling:	49.67	
Chain-of-Custody No.(s):	21	
Analytical Lab(s):	H2M	
Sampling Observations:		

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	16.4	6.4	388	33.2
End	17.5	6.4	370	>200

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	18.2	6.9	325	>200
7.5	16.8	6.9	402	>200
12	16.8	6.5	394	>200
18	16.7	6.4	390	70.0
24	16.5	6.4	390	43.1
30	16.4	6.4	388	33.2

Comments:

Air Temp: 80s
Weather Conditions:

SUNNY, FEW CLOUDS, SLIGHT BREEZE

Crew Chief Signature E Hollister Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls N-10474 10/4/99 10:40:55 AM+

LMS Well Sampling Log

Date: 19-Aug-99
Crew: E. HOLLISTER/D. KASSELL
Job No: 650-422
Project: NCIA WELL SAMPLING
Project Site: EDGEWOOD DRIVE

METERS USED

Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: DRT 15C s/n 19834

Well ID No.: N-10476
Well Condition: FAIR
Well Depth/Diameter: 130.00 4
Well Casing Type: PVC SCH 80
Screened Interval: 110-130
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 46.90
Water Column Ht./Vol.: 83.10 76.9
Purge Est.: 231.00
Purge Method(s): GRUNDFOS
Purge Date/Time(s): 19-Aug-99
17:10 17:50
Depth(s): ALL
Rates (gpm): 3
Purged Volume: ~120
DTW After Purging: DRY
Yield Rate: L - M - H L
Purge Observations:

DTW Before Sampling: 55.06
Sample Date/Time: 19-Aug-99 18:10
Sampling Method: Teflon bailer
Sampling Depth(s): TOC
DTW After Sampling: 55.05
Chain-of-Custody No.(s): 46
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	18.6	6.6	122	>200
End	16.2	6.9	94	17.2

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	16.9	7	136	>200
40	16.8	6.9	136	66.0
80	16.9	6.9	153	>200
120	18.6	6.6	122	>200

Comments:

NASSAU COUNTY DRAINAGE BASIN 367

Air Temp: 70-80s
Weather Conditions: HOT, HAZY, HUMID

Crew Cheif Signature E Hollister Date: 3-7.00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls N-10476 10/4/99 8:17:46 AM+

R2-0000805

LMS Well Sampling Log

Date:	18-Aug-99	**METERS USED**	
Crew:	B.C. / J.P. /D.K	Temp.:	DEC 560
Job No:	650-422	pH:	DEC 4-99-03
Project:	NCIA WELL SAMPLING	Cond.:	DEC 560
Project Site:	BARRINGTON ST	Turb.:	DRT 15C s/n 19834

Well ID No.:	N-10477		DTW Before Sampling:	46.80	
Well Condition:	GOOD		Sample Date/Time:	18-Aug-99	12:55
Well Depth/Diameter:	62.50	2	Sampling Method:	Teflon bailer	
Well Casing Type:	PVC		Sampling Depth(s):	TOC	
Screened Interval:	47-57		DTW After Sampling:	46.80	
Casing Ht./Lock No.:			Chain-of-Custody No.(s):	35	
Reference Pt.:	TOC		Analytical Lab(s):	H2M	
Depth to Water (DTW):	46.76		Sampling Observations:		
Water Column Ht./Vol.:	9.95	8.9			
Purge Est.:	27.00				
Purge Method(s):	GRUNDFOS				
Purge Date/Time(s):	18-Aug-99				
	12:21	12:36			
Depth(s):	ALL				
Rates (gpm):	2.00				
Purged Volume:	30.00				
DTW After Purging:	46.80				
Yield Rate: L - M - H	**H**				
Purge Observations:					

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	18.8	5.1	424	11.4
End	18.7	5.1	433	87.1

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	23.6	5.1	390	>200
6	18.8	5.1	419	>200
12	18	5.1	423	>100
18	19	5.1	421	>100
24	18.3	5.2	429	16.7
30	18.8	5.1	424	11.4

Comments:

Air Temp: 80s

Weather Conditions: HOT, HAZY, HUMID

Crew Cheif Signature E Hollister Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls N-10477 10/4/99 8:17:52 AM+

R2-0000806

LMS Well Sampling Log

Date:	18-Aug-99	METERS USED	
Crew:	B.C. / J.P. /D.K	Temp.:	DEC 560
Job No:	650-422	pH:	DEC 4-99-03
Project:	NCIA WELL SAMPLING	Cond.:	DEC 560
Project Site:	BARRINGTON ST	Turb.:	DRT 15C s/n 19834

Well ID No.:	N-10478		DTW Before Sampling:	46.80
Well Condition:	POOR		Sample Date/Time:	18-Aug-99 12:15
Well Depth/Diameter:	121.00	4	Sampling Method:	Teflon bailer
Well Casing Type:	PVC SCH 80		Sampling Depth(s):	TOC
Screened Interval:	100-121'		DTW After Sampling:	46.80
Casing Ht./Lock No.:			Chain-of-Custody No.(s):	34
Reference Pt.:	TOC		Analytical Lab(s):	H2M
Depth to Water (DTW):	46.75		Sampling Observations:	
Water Column Ht./Vol.:	74.25	71.1		
Purge Est.:	213.30			
Purge Method(s):	GRUNDFOS			
Purge Date/Time(s):	18-Aug-99			
	10:50	12:10		
Depth(s):	ALL			
Rates (gpm):	2.5			
Purged Volume:	180			
DTW After Purging:	46.80			
Yield Rate: L - M - H	H			

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	18	5.4	204	3.9
End	18	5.3	209	36

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

Purge Observations:

PURGE AMOUNT CALCULATED FOR 10' SCREEN

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	20.4	5.3	214	14.6
30	18.4	5.6	214	5.8
60	18.4	5.5	209	4.2
90	18.5	5.5	208	6.1
120	18.3	5.4	208	4.4
150	17.9	5.6	205	3.9
180	18	5.4	204	3.90

Air Temp: 80s

Weather Conditions: HOT, HAZY, HUMID

Comments:

Crew Cheif Signature E Hellert Date: 5-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls N-10478 10/4/99 8:17:57 AM+

LMS Well Sampling Log

Date:	18-Aug-99	METERS USED	
Crew:	B.C. / J.P. /D.K	Temp.:	DEC 560
Job No:	650-422	pH:	DEC 4-99-03
Project:	NCIA WELL SAMPLING	Cond.:	DEC 560
Project Site:	WESTLEY PL	Turb.:	DRT 15C s/n 19834

Well ID No.:	N-10479		DTW Before Sampling:	30.20
Well Condition:	GOOD		Sample Date/Time:	18-Aug-99 10:10
Well Depth/Diameter:	40.00	2	Sampling Method:	Teflon bailer
Well Casing Type:	PVC		Sampling Depth(s):	TOC
Screened Interval:	30-40		DTW After Sampling:	30.20
Casing Ht./Lock No.:			Chain-of-Custody No.(s):	33
Reference Pt.:	TOC		Analytical Lab(s):	H2M
Depth to Water (DTW):	30.27		Sampling Observations:	
Water Column Ht./Vol.:	9.73	8.7		
Purge Est.:	26.20			
Purge Method(s):	GRUNDFOS			
Purge Date/Time(s):	18-Aug-99 9:32	9:47		
Depth(s):	ALL			
Rates (gpm):	2.00			
Purged Volume:	30.00			
DTW After Purging:	30.20			
Yield Rate: L - M - H	H			
Purge Observations:				

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	15.6	6.9	312	29.3
End	15.9	7.1	320	>200

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	17.1	6	317	>200
5	15.2	6	306	>200
10	16.1	6.4	305	>100
15	15.7	6.7	312	77.1
20	15.3	6.7	315	52.1
25	15.1	6.8	312	39.5
30	15.6	6.9	312	29.30

Air Temp: 80s

Comments:

Weather Conditions: HOT, HAZY, HUMID

Crew Cheif Signature E Hollert Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls N-10479 10/4/99 8:18:02 AM+

R2-0000808

LMS Well Sampling Log

Date:	17-Aug-99	METERS USED	
Crew:	E. HOLLISTER/D. KASSELL	Temp.:	DEC 560
Job No:	650-422	pH:	DEC 4-99-03
Project:	NCIA WELL SAMPLING	Cond.:	DEC 560
Project Site:	DARLINGTON (ANNA)	Turb.:	DRT 15C s/n 19834

Well ID No.:	N-11848		DTW Before Sampling:	43.2	
Well Condition:	GOOD		Sample Date/Time:	17-Aug	9:40
Well Depth/Diameter:	60.00	2	Sampling Method:	Teflon bailer	
Well Casing Type:	PVC		Sampling Depth(s):	TOC	
Screened Interval:	50-55		DTW After Sampling:	43.2	
Casing Ht./Lock No.:			Chain-of-Custody No.(s):	27	
Reference Pt.:	TOC		Analytical Lab(s):	H2M	
Depth to Water (DTW):	43.18		Sampling Observations:		
Water Column Ht./Vol.:	16.82	11.6			
Purge Est.:	35.00				
Purge Method(s):	GRUNDFOS				
Purge Date/Time(s):	17-Aug-99				
	9:10	9:20			
Depth(s):	ALL				
Rates (gpm):	2, 1.5				
Purged Volume:	15.00				
DTW After Purging:	DRY				
Yield Rate: L - M - H	**L-M**				

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	16.2	6.6	386	43.2
End	16.4	7.4	372	>100

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

Purge Observations:

PURGED DRY TWICE

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	17.5	6	353	>200
5	16.3	6.9	376	>200
10	16.4	6.9	375	90.1
15	16.2	6.6	386	43.2

Comments:

IN GRASS

WATER COVERING CAP

Air Temp:

Weather Conditions:

Crew Cheif Signature E Hollister Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls N-11848 10/4/99 8:18:12 AM+

R2-0000809

LMS Well Sampling Log

Date: 19-Aug-99
Crew: E. HOLLISTER/D. KASSELL
Job No: 650-422
Project: NCIA WELL SAMPLING
Project Site: 25 ELTON

METERS USED
Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: DRT 15C s/n 19834

Well ID No.: N-11849
Well Condition: GOOD
Well Depth/Diameter: 60.00 2
Well Casing Type: PVC
Screened Interval: 50-55
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 49.25
Water Column Ht./Vol.: 10.75 9.6
Purge Est.: 28.90
Purge Method(s): GRUNDFOS
Purge Date/Time(s): 19-Aug-99
16:35 16:50
Depth(s): ALL
Rates (gpm): 2.00
Purged Volume: 30.00
DTW After Purging: 49.28
Yield Rate: L - M - H H
Purge Observations:

DTW Before Sampling: 49.28
Sample Date/Time: 19-Aug-99 17:10
Sampling Method: Teflon bailer
Sampling Depth(s): TOC
DTW After Sampling: 49.28
Chain-of-Custody No.(s): 47
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	15.7	6.3	217	67
End	16.2	6.3	192	>200

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	19.5	6.4	477	>200
6	15.8	6.6	201	>200
12	15.7	6.4	208	>100
18	16.2	6.6	212	>100
24	15.8	6.5	215	75.0
30	15.7	6.3	217	67.0

Comments:

Air Temp: 70-80s
Weather Conditions: HOT, HAZY, HUMID

Crew Cheif Signature E Hollister Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls N-11849 10/4/99 8:19:40 AM+

LMS Well Sampling Log

Date: 18-Aug-99
Crew: E. HOLLISTER/D. KASSELL
Job No: 650-422
Project: NCIA WELL SAMPLING
Project Site: GRAND AND HOPPER

METERS USED
Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: DRT 15C s/n 19834

Well ID No.: N-11850
Well Condition: GOOD
Well Depth/Diameter: 65.00 2
Well Casing Type: PVC
Screened Interval: BOTTOM 10'
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 51.70
Water Column Ht./Vol.: 13.30 11
Purge Est.: 33.00
Purge Method(s): GRUNDFOS
Purge Date/Time(s): 18-Aug-99 14:27 14:42
Depth(s): ALL
Rates (gpm): 2.00
Purged Volume: 30.00
DTW After Purging: 51.70
Yield Rate: L - M - H H
Purge Observations:

DTW Before Sampling: 51.70
Sample Date/Time: 18-Aug-99 15:05
Sampling Method: Teflon bailer
Sampling Depth(s): TOC
DTW After Sampling: 51.70
Chain-of-Custody No.(s): 36
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	17.4	6.5	383	4
End	18.1	6.6	225	>100

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	22.2	6.2	478	>200
6	17.3	6.4	355	18.0
12	17.4	6.4	366	7.0
18	17.9	6.2	371	5.0
24	17.4	6.4	375	4.0
30	17.4	6.5	383	4.0

Comments:

Air Temp: 80s
Weather Conditions: HOT, HAZY, HUMID

Crew Cheif Signature E Hollister Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls N-11850 10/4/99 8:19:45 AM+

LMS Well Sampling Log

Date: 19-Aug-99
Crew: E. HOLLISTER/D. KASSELL
Job No: 650-422
Project: NCIA WELL SAMPLING
Project Site: OLIVER & GRAND

METERS USED
Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: DRT 15C s/n 19834

Well ID No.: N-11851
Well Condition: GOOD
Well Depth/Diameter: 62.50 2
Well Casing Type: PVC
Screened Interval: BOTTOM 10'
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 53.20
Water Column Ht./Vol.: 9.30 8.3
Purge Est.: 25.00
Purge Method(s): GRUNDFOS
Purge Date/Time(s): 19-Aug-99 8:50 9:04
Depth(s): ALL
Rates (gpm): 2.00
Purged Volume: 28.00
DTW After Purging: 53.24
Yield Rate: L - M - H H
Purge Observations:

DTW Before Sampling: 53.2
Sample Date/Time: 19-Aug-99 9:35
Sampling Method: Teflon bailer
Sampling Depth(s): TOC
DTW After Sampling: 53.2
Chain-of-Custody No.(s): 41
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	16.9	7	616	10
End	17.1	6.9	630	>100

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	18.8	6.5	606	>200
7	17.4	6.8	599	17.0
14	17.3	6.9	600	10.2
21	16.9	6.9	611	6.0
28	16.9	7	616	10.0

Comments:

Air Temp: 70s
Weather Conditions: HOT, HAZY, HUMID

Crew Cheif Signature E Hollister Date: 3-7-00

Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls N-11851 10/4/99 8.19.50 AM

R2-0000812

LMS Well Sampling Log

Date: 19-Aug-99
Crew: E. HOLLISTER/D. KASSELL
Job No: 650-422
Project: NCIA WELL SAMPLING
Project Site: OLIVER & GRAND

METERS USED
Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: DRT 15C s/n 19834

Well ID No.: N-11852
Well Condition: GOOD
Well Depth/Diameter: 100.00 2
Well Casing Type: PVC
Screened Interval: 90-95
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 52.19
Water Column Ht./Vol.: 47.81 16.6
Purge Est.: 50.00
Purge Method(s): GRUNDFOS
Purge Date/Time(s): 19-Aug-99
7:47 8:13
Depth(s): ALL
Rates (gpm): 2.00
Purged Volume: 50.00
DTW After Purging: 52.20
Yield Rate: L - M - H H
Purge Observations:

DTW Before Sampling: 52.20
Sample Date/Time: 19-Aug-99 10:00
Sampling Method: Teflon bailer
Sampling Depth(s): TOC
DTW After Sampling: 52.20
Chain-of-Custody No.(s): 40
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	16.8	5.8	222	10
End	17.6	6.9	217	76.1

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	17.5	6.5	228	48.0
10	16.8	6.2	220	7.1
20	16.6	6.2	220	4.2
30	16.6	5.9	221	5.0
40	16.8	6	220	>100
50	16.8	5.8	222	10.0

Comments:

Air Temp: 70s
Weather Conditions: HOT, HAZY, HUMID

Crew Cheif Signature E. Hollister Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls N-11852 10/4/99 8:20:00 AM+

LMS Well Sampling Log

Date:	20-Aug-99	METERS USED	
Crew:	B. CAR / J. PFAFF	Temp.:	TLC #10
Job No:	650-422	pH:	N-3
Project:	NCIA WELL SAMPLING	Cond.:	TLC #10
Project Site:	989 OCR (BROOKLYN)	Turb.:	NYSDEC MONITEK S/N L-3324

Well ID No.:	N-11855	DTW Before Sampling:	50.15
Well Condition:	FAIR	Sample Date/Time:	20-Aug-99 11:05
Well Depth/Diameter:	60.25 2	Sampling Method:	Teflon bailer
Well Casing Type:	PVC	Sampling Depth(s):	TOC
Screened Interval:	bottom 5' + 5' sump	DTW After Sampling:	50.15
Casing Ht./Lock No.:		Chain-of-Custody No.(s):	53
Reference Pt.:	TOC	Analytical Lab(s):	H2M
Depth to Water (DTW):	50.10	Sampling Observations:	
Water Column Ht./Vol.:	10.15 9.1		
Purge Est.:	27.30		
Purge Method(s):	Submersible pump		
Purge Date/Time(s):	20-Aug-99 9:50 10:55		
Depth(s):	ALL		
Rates (gpm):	0.50		
Purged Volume:	30.00		
DTW After Purging:	50.15		
Yield Rate: L - M - H	L		
Purge Observations:			

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	20.3	6.7	312	4
End	19.6	6.7	163	>100

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	19.3	6.7	365	>200
5	19.2	6.7	368	>200
10	19.4	6.6	372	42.0
15	19.7	6.7	357	22.0
20	19.7	6.5	350	6.0
25	19.9	6.6	333	5.0
30	20.3	6.7	312	4.00

Air Temp: High 70s

Weather Conditions: OVERCAST

Comments:

Crew Cheif Signature E Hallett Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls N-11855 10/4/99 8:20:07 AM+

LMS Well Sampling Log

Date:	23-Aug-99	METERS USED	
Crew:	E. HOLLISTER/D. KASSELL	Temp.:	DEC 560
Job No:	650-422	pH:	DEC 4-99-03
Project:	NCIA WELL SAMPLING	Cond.:	DEC 560
Project Site:	DAYTON & OLIVER	Turb.:	DRT 15C s/n 19834

Well ID No.: N-11858

Well Condition: GOOD

Well Depth/Diameter: 60.00 2

Well Casing Type: PVC

Screened Interval: 50-55

Casing Ht./Lock No.:

Reference Pt.: TOC

Depth to Water (DTW): 47.65

Water Column Ht./Vol.: 12.35 10.8

Purge Est.: 32.50

Purge Method(s): Submersible pump

Purge Date/Time(s): 23-Aug-99 11:36 12:50

Depth(s): bottom

Rates (gpm): 0.50

Purged Volume: 33.00

DTW After Purging: 49.35

Yield Rate: L - M - H **L**

Purge Observations:

DTW Before Sampling: 47.9

Sample Date/Time: 23-Aug-99 13:09

Sampling Method: Teflon bailer

Sampling Depth(s): TOC

DTW After Sampling: 47.7

Chain-of-Custody No.(s): 56

Analytical Lab(s): H2M

Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	19.5	6.1	332	5
End	16.9	6.4	335	>100

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	17.6	6.4	349	23.0
6	19.2	5.9	336	20.0
12	19.1	6.1	336	9.0
18	19.5	6.2	335	7.0
24	19.4	6.1	335	6.0
33	19.5	6.1	332	5.0

Comments:

Air Temp: 80s

Weather Conditions: HOT, HUMID, SUNNY

Crew Cheif Signature E Hollister Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls N-11858 10/4/99 8.20.14 AM+

R2-0000815

LMS Well Sampling Log

Date: 16-Aug-99
Crew: E. HOLLISTER/D. KASSELL
Job No: 650-422
Project: NCIA WELL SAMPLING
Project Site: GRAYSTON & OCR

METERS USED
Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: DRT 15C s/n 19834

Well ID No.: N-11859
Well Condition: GOOD
Well Depth/Diameter: 60.20 2
Well Casing Type: PVC
Screened Interval: BOTTOM 5 + 5 sump
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 49.57
Water Column Ht./Vol.: 10.63 9.5
Purge Est.: 28.60
Purge Method(s): GRUNDFOS
Purge Date/Time(s): 16-Aug-99
13:33 13:48
Depth(s): ALL
Rates (gpm): 2.50
Purged Volume: 30.00
DTW After Purging: 49.57
Yield Rate: L - M - H H
Purge Observations:

DTW Before Sampling: 49.57
Sample Date/Time: 16-Aug-99 14:15
Sampling Method: Teflon bailer
Sampling Depth(s): TOC
DTW After Sampling: 49.57
Chain-of-Custody No.(s): 22-24
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	17	5.5	339	89.1
End	17.9	5.7	449	>200

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	19.3	6.2	307	>200
5	17.1	5.9	362	>100
10	17.1	5.8	369	73.0
15	17	5.6	356	36.5
20	17	5.6	351	51.0
25	17	5.5	347	21.2
30	17	5.5	339	89.10

Air Temp:
Weather Conditions:

Comments:

MS/MSD

Crew Cheif Signature E Hollister Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls N-11859 10/4/99 8:20:20 AM+

R2-0000816

LMS Well Sampling Log

Date: 23-Aug-99
Crew: E. HOLLISTER/D. KASSELL
Job No: 650-422
Project: NCIA WELL SAMPLING
Project Site: 2541 ASTER

METERS USED

Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: DRT 15C s/n 19834

Well ID No.: N-11860
Well Condition: FAIR
Well Depth/Diameter: 60.15 2
Well Casing Type: PVC
Screened Interval: BOTTOM 5'
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 49.16
Water Column Ht./Vol.: 10.99 6.9
Purge Est.: 21.00
Purge Method(s): Submersible pump
Purge Date/Time(s): 23-Aug-99 10:15 10:40
Depth(s): bottom
Rates (gpm): 1.00
Purged Volume: 21.00
DTW After Purging: 49.16
Yield Rate: L - M - H L
Purge Observations:

DTW Before Sampling: 49.16
Sample Date/Time: 23-Aug-99 11:00
Sampling Method: Teflon bailer
Sampling Depth(s): TOC
DTW After Sampling: 49.16
Chain-of-Custody No.(s): 55
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	16.2	5.6	150	4
End	16.6	6	150	>200

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	18.8	6	157	>200
5	16.3	5.8	139	16.0
10	16.3	5.8	139	9.0
15	16.2	5.8	139	6.0
21	16.2	5.6	150	4.0

Comments:

Air Temp: 70s
Weather Conditions: HUMID, SUNNY

Crew Cheif Signature E Hollister   Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls N-11860 10/4/99 8:20:27 AM+

LMS Well Sampling Log

Date:	10-Aug-99	**METERS USED**	
Crew:	E. HOLLISTER/D. KASSELL	Temp.:	DEC 560
Job No:	650-422	pH:	DEC 4-99-03
Project:	NCIA WELL SAMPLING	Cond.:	DEC 560
Project Site:	1054 Bowling Green Dr.	Turb.:	DRT 15C s/n 19834

Well ID No.:	N-11861		DTW Before Sampling:	49.04
Well Condition:	good		Sample Date/Time:	10-Aug-99
Well Depth/Diameter:	60.10	2	Sampling Method:	Teflon bailer
Well Casing Type:	PVC		Sampling Depth(s):	TOC
Screened Interval:	Bottom 5 + 5 sump		DTW After Sampling:	49.04
Casing Ht./Lock No.:			Chain-of-Custody No.(s):	09
Reference Pt.:	TOC		Analytical Lab(s):	H2M
Depth to Water (DTW):	49.04		Sampling Observations:	
Water Column Ht./Vol.:	11.06	9.9		
Purge Est.:	30.00			
Purge Method(s):	GRUNDFOS			
Purge Date/Time(s):	10-Aug-99			
	12:48	13:00		
Depth(s):	ALL			
Rates (gpm):	2.50			
Purged Volume:	30.00			
DTW After Purging:	49.04			
Yield Rate: L - M - **H**	**H**			

Purge Observations:

tan, silty

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	16.4	4.7	172	6.4
End	16.9	5.7	172	>200

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	19.3	4.7	174	>200
5	16.6	4.8	169	>100
10	16.6	4.7	168	22.6
15	16.5	4.6	169	12.4
20	16.4	4.7	170	7.5
25	16.4	4.7	170	7.1
30	16.4	4.7	172	6.4

Air Temp: 80s

Comments: in grass

Weather Conditions:

Crew Cheif Signature E Hollister Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls N-11861 10/4/99 8:20:31 AM+

LMS Well Sampling Log

Date:	17-Aug-99	METERS USED	
Crew:	E. HOLLISTER/D. KASSELL	Temp.:	DEC 560
Job No:	650-422	pH:	DEC 4-99-03
Project:	NCIA WELL SAMPLING	Cond.:	DEC 560
Project Site:	653 EDGEWOOD (MYRON)	Turb.:	DRT 15C s/n 19834

Well ID No.:	N-11862	DTW Before Sampling:	46.24
Well Condition:	GOOD	Sample Date/Time:	17-Aug-99 12:15
Well Depth/Diameter:	60.00 2	Sampling Method:	Teflon bailer
Well Casing Type:	PVC	Sampling Depth(s):	TOC
Screened Interval:	50-55	DTW After Sampling:	46.24
Casing Ht./Lock No.:		Chain-of-Custody No.(s):	29
Reference Pt.:	TOC	Analytical Lab(s):	H2M
Depth to Water (DTW):	46.18	Sampling Observations:	
Water Column Ht./Vol.:	13.82		
Purge Est.:	35.00		
Purge Method(s):	GRUNDFOS		
Purge Date/Time(s):	17-Aug-99 11:40 11:59		
Depth(s):	ALL		
Rates (gpm):	2.00		
Purged Volume:	35.00		
DTW After Purging:	46.20		
Yield Rate: L - M - H	H		
Purge Observations:			

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	17.3	5.5	205	21.2
End	17.4	5.6	210	>100

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	19.4	5.6	216	>200
7	16.8	5.6	206	>100
14	17.4	5.4	206	97.0
21	17.3	5.4	208	45.2
28	17.1	5.6	205	14.1
35	17.3	5.5	205	21.20

Comments:

Air Temp:

Weather Conditions:

Crew Cheif Signature E. Hollister Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls N-11862 10/4/99 8:20:38 AM+

R2-0000819

LMS Well Sampling Log

Date:	17-Aug-99	METERS USED	
Crew:	E. HOLLISTER/D. KASSELL	Temp.:	DEC 560
Job No:	650-422	pH:	DEC 4-99-03
Project:	NCIA WELL SAMPLING	Cond.:	DEC 560
Project Site:	33 SYLVESTER (DRIVEWAY)	Turb.:	DRT 15C s/n 19834

Well ID No.:	AIM-33-1		DTW Before Sampling:	53.35	
Well Condition:	GOOD		Sample Date/Time:	17-Aug-99	16:00
Well Depth/Diameter:	64.00	4	Sampling Method:	Teflon bailer	
Well Casing Type:	PVC		Sampling Depth(s):	TOC	
Screened Interval:	BOTTOM 10'		DTW After Sampling:	53.35	
Casing Ht./Lock No.:			Chain-of-Custody No.(s):	31	
Reference Pt.:	TOC		Analytical Lab(s):	H2M	
Depth to Water (DTW):	53.35		Sampling Observations:		
Water Column Ht./Vol.:	9.65	16.2			
Purge Est.:	50.00				
Purge Method(s):	GRUNDFOS				
Purge Date/Time(s):	17-Aug-99				
	15:10	15:50			
Depth(s):	ALL				
Rates (gpm):	2.00				
Purged Volume:	50.00				
DTW After Purging:	53.35				
Yield Rate: L - M - H	**M**				

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	18.5	5.4	171	>200
End	17.9	5.4	153	>200

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

Purge Observations:

PUMP PROBLEMS **VERY SILTY**

STOPPED PUMPING TWICE

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	20.5	5.2	182	>200
10	18.1	5.1	173	>200
20	19.3	5.3	149	>200
30	18.9	5.3	161	>200
40	18.6	5.2	170	>200
50	18.5	5.4	171	>200

Comments:

Air Temp: 80s

Weather Conditions: HOT, HAZY, HUMID
SLIGHT BREEZE

Crew Cheif Signature E Hollister Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls AIM-33-1 10/4/99 8:21:37 AM+

LMS Well Sampling Log

Date:	19-Aug-99	METERS USED	
Crew:	B. CAR / J. PFAFF	Temp.:	TLC #10
Job No:	650-422	pH:	N-3
Project:	NCIA WELL SAMPLING	Cond.:	TLC #10
Project Site:	NE CORNER BOND & MAIN	Turb.:	NYSDEC MONITEK S/N L-3324

Well ID No.:	ANSON MW-8		DTW Before Sampling:	54.60	
Well Condition:	FAIR		Sample Date/Time:	19-Aug-99	7:50
Well Depth/Diameter:	57.20	4	Sampling Method:	Teflon bailer	
Well Casing Type:	PVC		Sampling Depth(s):	TOC	
Screened Interval:	BOTTOM 10'		DTW After Sampling:	54.60	
Casing Ht./Lock No.:			Chain-of-Custody No.(s):	45	
Reference Pt.:	TOC		Analytical Lab(s):	H2M	
Depth to Water (DTW):	53.80		Sampling Observations:		
Water Column Ht./Vol.:	3.40	5.7			
Purge Est.:	17.10				
Purge Method(s):	Submersible pump				
Purge Date/Time(s):	19-Aug-99				
	7:10	7:45			
Depth(s):	ALL				
Rates (gpm):	1.25				
Purged Volume:	30.00				
DTW After Purging:	54.60				
Yield Rate: L - M - H	L				
Purge Observations:					

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	17.8	5.3	79	>200
End	17.1	5.3	76	>200

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	17.3	5.2	88	>200
5	17.2	5.2	81	>200
10	17.3	5.1	80	>200
15	17.7	5.1	80	>200
20	18.4	5.1	78	>200
25	17.4	5.3	81	>200
30	17.8	5.3	79	>200

Air Temp: 70-80s

Weather Conditions: HOT, HAZY, HUMID

Comments:

Stopped flow @ 7:30, well dry. Allow 5 mins. Recharge.

Crew Cheif Signature E. Holbrook Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls ANSON MW-8 10/4/99 8:21:46 AM+

R2-0000821

LMS Well Sampling Log

Date:	17-Aug-99	METERS USED	
Crew:	E. HOLLISTER/D. KASSELL	Temp.:	DEC 560
Job No:	650-422	pH:	DEC 4-99-03
Project:	NCIA WELL SAMPLING	Cond.:	DEC 560
Project Site:	67 SYLVESTER	Turb.:	DRT 15C s/n 19834

Well ID No.:	DOAK-MW-1		DTW Before Sampling:	64.00
Well Condition:	GOOD		Sample Date/Time:	17-Aug-99 14:25
Well Depth/Diameter:	64.00	4	Sampling Method:	Teflon bailer
Well Casing Type:	PVC		Sampling Depth(s):	TOC
Screened Interval:	BOTTOM 10'		DTW After Sampling:	64.00
Casing Ht./Lock No.:			Chain-of-Custody No.(s):	30
Reference Pt.:	TOC		Analytical Lab(s):	H2M
Depth to Water (DTW):	54.00		Sampling Observations:	
Water Column Ht./Vol.:	10.00	16.8		
Purge Est.:	50.00			
Purge Method(s):	GRUNDFOS			
Purge Date/Time(s):	17-Aug-99			
	13:35	14:00		
Depth(s):	ALL			
Rates (gpm):	2.00			
Purged Volume:	50.00			
DTW After Purging:	64.00			
Yield Rate: L - M - H	**H**			
Purge Observations:				

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	17.9	5.1	392	18.4
End	17.7	5.1	495	31.2

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	22.3	5.6	456	>200
10	18.1	5.1	407	>200
20	17.9	5.1	402	70.0
30	17.9	5	393	33.0
40	17.9	5.1	394	27.2
50	17.9	5.1	392	18.4

Comments:

Air Temp: 80s

Weather Conditions: HOT, HAZY, HUMID

Crew Cheif Signature E. Hollister Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls DOAK-MW-1 10/4/99 8:21:32 AM+

LMS Well Sampling Log

Date:
Crew: E. HOLLISTER/D. KASSELL
Job No: 650-422
Project: NCIA WELL SAMPLING
Project Site: ALLEY BETWEEN KINKLE AND SYLVESTE
OFF MAIN

METERS USED
Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: DRT 15C s/n 19834

Well ID No.: FLMW-204B
Well Condition: GOOD
Well Depth/Diameter: 110.00 2
Well Casing Type: PVC
Screened Interval: BOTTOM 10'
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 54.47
Water Column Ht./Vol.: 55.53 17.9
Purge Est.: 53.60
Purge Method(s): GRUNDFOS
Purge Date/Time(s): 16-Aug-99
15:13 15:31
Depth(s): ALL
Rates (gpm): 3.00
Purged Volume: 54.00
DTW After Purging: 54.47
Yield Rate: L - M - H H
Purge Observations:

DTW Before Sampling: 54.47
Sample Date/Time: 16-Aug-99 16:05
Sampling Method: Teflon bailer
Sampling Depth(s): TOC
DTW After Sampling: 54.47
Chain-of-Custody No.(s): 25
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	16.3	5.5	410	>100
End	16.6	5.9	441	27

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	17.6	5.8	421	>200
9	16.6	5.6	414	>200
18	16.5	5.6	411	>200
27	16.4	5.6	410	>200
36	16.4	5.6	411	>100
45	16.3	5.6	404	>100
54	16.3	5.5	410	>100

Air Temp: 80s
Comments:
Weather Conditions: SUNNY, HOT, HUMID

Crew Cheif Signature E Hollister Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls FLMW-204B 10/4/99 8:21:27 AM+

LMS Well Sampling Log

Date:	20-Aug-99	**METERS USED**	
Crew:	E. HOLLISTER/D. KASSELL	Temp.:	DEC 560
Job No:	650-422	pH:	DEC 4-99-03
Project:	NCIA WELL SAMPLING	Cond.:	DEC 560
Project Site:	57 KINKLE	Turb.:	DRT 15C s/n 19834

Well ID No.:	FLMW-205B		DTW Before Sampling:	53.8	
Well Condition:	GOOD		Sample Date/Time:	20-Aug-99	12:50
Well Depth/Diameter:	110.00	2	Sampling Method:	Teflon bailer	
Well Casing Type:	PVC		Sampling Depth(s):	TOC	
Screened Interval:	BOTTOM 10'		DTW After Sampling:	53.75	
Casing Ht./Lock No.:			Chain-of-Custody No.(s):	51	
Reference Pt.:	TOC		Analytical Lab(s):	H2M	
Depth to Water (DTW):	53.70		Sampling Observations:		
Water Column Ht./Vol.:	56.30	18			
Purge Est.:	54.00				
Purge Method(s):	GRUNDFOS				
Purge Date/Time(s):	20-Aug-99				
	12:03	12:25			
Depth(s):	ALL				
Rates (gpm):	2.50				
Purged Volume:	55.00				
DTW After Purging:	53.80				
Yield Rate: L - M - H	**H**				
Purge Observations:					

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	16.5	5	325	>100
End	17.3	5.5	339	>100

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	17.2	5.2	326	>200
10	15.9	5.2	328	>200
20	15.8	5.3	327	>200
30	16	5.3	326	>200
40	15.8	5.1	327	>200
55	16.5	5	325	>100

Comments:

Air Temp: High 70s

Weather Conditions: OVERCAST

Crew Cheif Signature E Hollister Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls FLMW-205B 10/4/99 8:21:52 AM+

LMS Well Sampling Log

Date: 10-Aug-99
Crew: E. HOLLISTER/D. KASSELL
Job No: 650-422
Project: NCIA WELL SAMPLING
Project Site: SALISBURY

METERS USED
Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: DRT 15C s/n 19834

Well ID No.: NRMW-1
Well Condition: NEW
Well Depth/Diameter: 70.36 2
Well Casing Type: PVC
Screened Interval: BOTTOM 10'
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 43.68
Water Column Ht./Vol.: 26.68 13.2
Purge Est.: 40.00
Purge Method(s): GRUNDFOS
Purge Date/Time(s): 10-Aug-99
9:30 9:50
Depth(s): ALL
Rates (gpm): 2.50
Purged Volume: 40.00
DTW After Purging: 43.68
Yield Rate: L - M - H H
Purge Observations:
tan, silty

DTW Before Sampling: 43.68
Sample Date/Time: 10-Aug-99 10:00
Sampling Method: Teflon bailer
Sampling Depth(s): TOC
DTW After Sampling: 43.68
Chain-of-Custody No.(s): 06
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	15.3	5	155	87.5
End	15.4	5.6	133	21.4

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	17.2	5.6	154	>200
10	15.5	5.4	152	112.5
20	15.4	5.5	154	17.0
30	15.3	5.1	154	11.0
40	15.3	5	155	87.5

Comments:

Air Temp: 70
Weather Conditions:

Crew Cheif Signature E Hollister Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls NRMW-1 10/4/99 8:20:44 AM+

R2-0000825

LMS Well Sampling Log

Date: 10-Aug-99
Crew: E. HOLLISTER/D. KASSELL
Job No: 650-422
Project: NCIA WELL SAMPLING
Project Site: BOWLING GREEN

METERS USED

Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: DRT 15C s/n 19834

Well ID No.:	NRMW-2		DTW Before Sampling:	47.44
Well Condition:	NEW		Sample Date/Time:	10-Aug-99 12:10
Well Depth/Diameter:	70.20	2	Sampling Method:	Teflon bailer
Well Casing Type:	PVC		Sampling Depth(s):	TOC
Screened Interval:	BOTTOM 10'		DTW After Sampling:	47.44
Casing Ht./Lock No.:			Chain-of-Custody No.(s):	08
Reference Pt.:	TOC		Analytical Lab(s):	H2M
Depth to Water (DTW):	47.44		Sampling Observations:	
Water Column Ht./Vol.:	22.76	12.5		
Purge Est.:	38.00			
Purge Method(s):	GRUNDFOS			
Purge Date/Time(s):	10-Aug-99			
	11:38	11:55		
Depth(s):	ALL			
Rates (gpm):	2.50			
Purged Volume:	40.00			
DTW After Purging:	47.44			
Yield Rate: L - M - H	H			

Purge Observations:

tan, silty

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	16.9	4.7	271	9.7
End	17.7	5.4	225	31.7

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	16.2	5.3	256	>200
10	17.3	4.7	270	47.2
20	16.9	4.7	270	35.4
30	16.8	4.7	271	19.5
40	16.9	4.7	271	9.7

Comments:

Air Temp: 80s
Weather Conditions:

Crew Cheif Signature E Hollister Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls NRMW-2 10/4/99 8:20:55 AM+

LMS Well Sampling Log

Date: 10-Aug-99
Crew: E. HOLLISTER/D. KASSELL
Job No: 650-422
Project: NCIA WELL SAMPLING
Project Site: MERILLON

METERS USED
Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: DRT 15C s/n 19834

Well ID No.:	NRMW-3	
Well Condition:	NEW	
Well Depth/Diameter:	70.90	2
Well Casing Type:	PVC	
Screened Interval:	BOTTOM 10'	
Casing Ht./Lock No.:		
Reference Pt.:	TOC	
Depth to Water (DTW):	43.29	
Water Column Ht./Vol.:	27.61	13.3
Purge Est.:	40.00	
Purge Method(s):	GRUNDFOS	
Purge Date/Time(s):	10-Aug-99	
	10:30	10:55
Depth(s):	ALL	
Rates (gpm):	2.50	
Purged Volume:	40.00	
DTW After Purging:	43.30	
Yield Rate: L - M - **H**	**H**	

Purge Observations:
tan, silty

DTW Before Sampling:	43.3	
Sample Date/Time:	10-Aug-99	11:10
Sampling Method:	Teflon bailer	
Sampling Depth(s):	TOC	
DTW After Sampling:	43.3	
Chain-of-Custody No.(s):	07	
Analytical Lab(s):	H2M	
Sampling Observations:		

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	15.8	6.2	163	4.2
End	15.8	6.2	131	19

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	17	5.7	159	>100
10	16	5.9	161	30.0
20	16	6	162	7.2
30	15.8	6	162	12.4
40	15.8	6.2	163	4.2

Comments:

Air Temp: 70s
Weather Conditions:

Crew Cheif Signature E Hollister Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls NRMW-3 10/4/99 8:21:02 AM+

R2-0000827

LMS Well Sampling Log

Date:	17-Aug-99	**METERS USED**	
Crew:	E. HOLLISTER/D. KASSELL	Temp.:	DEC 560
Job No:	650-422	pH:	DEC 4-99-03
Project:	NCIA WELL SAMPLING	Cond.:	DEC 560
Project Site:	1145 ROXBURY	Turb.:	DRT 15C s/n 19834

Well ID No.:	NRMW-4		DTW Before Sampling:	45.00
Well Condition:	NEW		Sample Date/Time:	17-Aug-99
Well Depth/Diameter:	70.60	2	Sampling Method:	Teflon bailer
Well Casing Type:	PVC		Sampling Depth(s):	TOC
Screened Interval:	BOTTOM 10'		DTW After Sampling:	45.00
Casing Ht./Lock No.:			Chain-of-Custody No.(s):	28
Reference Pt.:	TOC		Analytical Lab(s):	H2M
Depth to Water (DTW):	45.00		Sampling Observations:	
Water Column Ht./Vol.:	25.60	13		
Purge Est.:	39.00			
Purge Method(s):	GRUNDFOS			
Purge Date/Time(s):	17-Aug-99			
	10:25	10:45		
Depth(s):	ALL			
Rates (gpm):	2.00			
Purged Volume:	40.00			
DTW After Purging:	45.00			
Yield Rate: L - M - H	H			
Purge Observations:				

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	17.6	5.7	93	67
End	16.7	97	23	

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	17.6	6.2	109	>200
10	17.6	6.1	97	>200
20	17.6	6.1	94	>100
30	17.6	5.9	94	61.2
40	17.6	5.7	93	67.0

Comments:

Air Temp:

Weather Conditions:

Crew Cheif Signature E Hollister Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls NRMW-4 10/4/99 8:21:11 AM+

R2-0000828

LMS Well Sampling Log

Date:	18-Aug-99	**METERS USED**	
Crew:	E. HOLLISTER/D. KASSELL	Temp.:	DEC 560
Job No:	650-422	pH:	DEC 4-99-03
Project:	NCIA WELL SAMPLING	Cond.:	DEC 560
Project Site:	ROYAL GUARD, MAIN STREET	Turb.:	DRT 15C s/n 19834

Well ID No.:	RGMW-1		DTW Before Sampling:	53.32
Well Condition:	FAIR		Sample Date/Time:	18-Aug-99 17:05
Well Depth/Diameter:	56.00		Sampling Method:	Teflon bailer
Well Casing Type:	PVC		Sampling Depth(s):	TOC
Screened Interval:	BOTTOM 10'		DTW After Sampling:	53.32
Casing Ht./Lock No.:			Chain-of-Custody No.(s):	37
Reference Pt.:	TOC		Analytical Lab(s):	H2M
Depth to Water (DTW):	53.31		Sampling Observations:	
Water Column Ht./Vol.:	2.69	2.4		
Purge Est.:	7.50			
Purge Method(s):	Teflon bailer			
Purge Date/Time(s):	18-Aug-99			
	15:49	16:54		
Depth(s):	ALL			
Rates (gpm):	<.25			
Purged Volume:	7.50			
DTW After Purging:	53.32			
Yield Rate: L - M - H	**M**			
Purge Observations:				

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	17.2	6	210	>200
End	17.3	6.1	217	>200

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	18.1	6	218	>200
2	17.3	6	210	>200
4	17.2	6.1	208	>200
6	17.1	6	211	>200
7.5	17.2	6	210	>200

Comments:

Air Temp: 80s
Weather Conditions: HOT, HAZY, HUMID

Crew Cheif Signature E Hollister Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls RGMW-1 10/4/99 8:21:16 AM+

LMS Well Sampling Log

Date: 16-Aug-99
Crew: E. HOLLISTER/D. KASSELL
Job No: 650-422
Project: NCIA WELL SAMPLING
Project Site: 80 SWALM

METERS USED

Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: DRT 15C s/n 19834

Well ID No.: UN-16
Well Condition: GOOD
Well Depth/Diameter: 70.00 4
Well Casing Type: PVC
Screened Interval: BOTTOM 10'
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 53.70
Water Column Ht./Vol.: 16.30 23
Purge Est.: 70.00
Purge Method(s): GRUNDFOS
Purge Date/Time(s): 16-Aug-99 17:07 17:32
Depth(s): ALL
Rates (gpm): 3.00
Purged Volume: 72.00
DTW After Purging: 53.70
Yield Rate: L - M - H H
Purge Observations:

DTW Before Sampling: 53.70
Sample Date/Time: 16-Aug-99 18:00
Sampling Method: Teflon bailer
Sampling Depth(s): TOC
DTW After Sampling: 53.70
Chain-of-Custody No.(s): 26
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	17.1	5.9	392	12.1
End	17.2	6	375	61.2

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	18.8	6	394	>200
12	17.1	6	393	>200
24	17.2	6	392	56.1
36	17	6	390	27.40
48	17	5.9	388	18.0
60	17.1	6	387	15.1
72	17.1	5.9	392	12.1

Comments:

Air Temp: 80s
Weather Conditions:

SUNNY, HOT, HUMID, SLIGHT BREEZE

Crew Cheif Signature E Hollister Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls UN-16 10/4/99 8:34:13 AM+

LMS Well Sampling Log

Date:	24-Aug-99	**METERS USED**	
Crew:	E. HOLLISTER/D. KASSELL	Temp.:	DEC 560
Job No:	650-422	pH:	DEC 4-99-03
Project:	NCIA WELL SAMPLING	Cond.:	DEC 560
Project Site:	558 MAIN ST (SWALM) FEDERICO'S	Turb.:	DRT 15C s/n 19834

Well ID No.:	UN-23		DTW Before Sampling:	
Well Condition:	FAIR		Sample Date/Time:	24-Aug-99 11:30
Well Depth/Diameter:	65.00	4	Sampling Method:	Teflon bailer
Well Casing Type:	PVC		Sampling Depth(s):	TOC
Screened Interval:	BOTTOM 10'		DTW After Sampling:	
Casing Ht./Lock No.:			Chain-of-Custody No.(s):	60
Reference Pt.:	TOC		Analytical Lab(s):	H2M
Depth to Water (DTW):	54.00		Sampling Observations:	
Water Column Ht./Vol.:	11.00	18.5		
Purge Est.:	55.50			
Purge Method(s):	GRUNDFOS			
Purge Date/Time(s):	24-Aug-99			
	10:56	11:16		
Depth(s):	BOTTOM			
Rates (gpm):	3.00			
Purged Volume:	60.00			
DTW After Purging:				
Yield Rate: L - M - H	H			
Purge Observations:				

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	17.1	5.7	463	7
End	18.3	5.7	438	34

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter
VOCs		HCl	

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.
0	20.1	6	451	>200
10	17.4	5.6	454	>100
20	17.3	5.6	456	>100
30	17	5.7	460	32.0
40	17.3	5.6	460	19.0
50	17.2	5.7	460	11.0
60	17.1	5.7	463	7.00

Comments:

Air Temp: 80s

Weather Conditions:
HOT, HUMID, PARTLY CLOUDY

Crew Cheif Signature E. Hollister Date: 3-7-00

+Disk No.: C:\My Documents\2nd round Well sampling SAMPLE list1.xls UN-23 10/4/99 8:41 49 AM+

Table D-2
Well sampling list
August 1999

NYSDEC sample #	Well ID	date	time	sampler	NOTES
01	EW-2C	9-Aug	13:45	eh/dk	
02	EW-2B	9-Aug	15:25	eh/dk	
03	EW-1C	9-Aug	16:50	eh/dk	
04	EW-1B	9-Aug	18:25	eh/dk	
	TB-1	9-Aug			
05	N-9939	10-Aug	9:00	eh/dk	with
06	NRMW-1	10-Aug	10:00	eh/dk	
07	NRMW-3	10-Aug	11:10	eh/dk	
08	NRMW-2	10-Aug	12:10	eh/dk	
09	N-11861	10-Aug	13:20	eh/dk	
10	N-9937	10-Aug	14:15	eh/dk	blind dup OF N-9938
11-13	N-9938	10-Aug	15:45	eh/dk	MS/MSD
14	N-10459	12-Aug	11:50	eh/dk	
15	N-10329	12-Aug	13:50	eh/dk	
16	N-10462	12-Aug	15:40	eh/dk	
17	N-10323	12-Aug	17:00	eh/dk	blind dup of N-10324
	TB-2	12-Aug			
18	N-10324	13-Aug	10:00	eh/dk	with
19	N-10472	13-Aug	12:10	eh/dk	
20	TB-3	16-Aug			
21	N-10474	16-Aug	12:10	eh/dk	
25	FLMW-204B	16-Aug	16:05	eh/dk	
26	UN-16	16-Aug	18:00	eh/dk	
22-24	N-11859	16-Aug	14:15	eh/dk	MS/MSD
27	N-11848	17-Aug	9:40	eh/dk	
28	NRMW-4	17-Aug	11:00	eh/dk	
29	N-11862	17-Aug	12:15	eh/dk	
30	DOAK-MW-1	17-Aug	14:25	eh/dk	
31	AIM-33-1	17-Aug	16:00	eh/dk	
32	TB-4	18-Aug			
33	N-10479	18-Aug	10:10	DK	
34	N-10478	18-Aug	12:15	DK	
35	N-10477	18-Aug	12:55	DK	
36	N-11850	18-Aug	15:05	eh/dk	
37	RGMW-1	18-Aug	17:05	eh/dk	
38	N-10321	18-Aug	16:00	BC/JP	
39	TB-5	19-Aug			
40	N-11852	19-Aug	10:00	JT/DK	
41	N-11851	19-Aug	9:35	eh/dk	
42	N-10470	19-Aug	11:25	eh/dk	
43	N-10328	19-Aug	8:50	BC/JP	
44	N-10326	19-Aug	10?40	BC/JP	
45	Anson MW-8	19-Aug	7:50	BC/JP	
46	N-10476	19-Aug	18:10	eh/dk	
47	N-11849	19-Aug	17:10	eh/dk	
48	N-10471D	20-Aug	9:00	eh/dk	
49	N-10471S	20-Aug	10:23	eh/dk	
50	N-10327	20-Aug	8:55	BC/JP	
51	FLMW-205B	20-Aug	12:50	eh/dk	
52	N-10325	20-Aug	12:08	BC/JP	
53	N-11855	20-Aug	11:05	BC/JP	
54	TB-6	23-Aug			
55	N-11860	23-Aug	11:00	eh/dk	
56	N-11858	23-Aug	13:09	eh/dk	
57	N-10464	23-Aug	14:35	eh/dk	
58	N-10465	23-Aug	16:00	eh/dk	
59	N-10322	23-Aug	17:45	eh/dk	
60	UN-23	24-Aug	11:30	eh/dk	
	N-11854	ocr & sylvester			
	NYT MW-3	between rushmore & urban			
	N-10475	CONNECTED TO N-10476 ?			
	N-11853	NOT LOCATED			
	HARMON MW-1	NOT LOCATED			
	TOTAL WELLS SAMPLED = 50				

MONITORING WELL SAMPLING LOGS
JANUARY 2000

LMS Well Sampling Log

Date: 1/13/2000
Crew: EH, JP, DK
Job No: 650-426
Project: NCIA Well Sampling
Project Site: FLOWER

METERS USED

Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: Monitek

Early warning well 1 shallower

Well ID No.: EW-1B
Well Condition: GOOD
Well Depth/Diameter: 164.00 2
Well Casing Type: PVC
Screened Interval: BOTTOM 10'
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 48.04
Water Column Ht./Vol.: 115.96 27.7
Purge Est.: 83.2
Purge Method(s): Grundfos
Purge Date/Time(s): 1/13/2000 12:15-12:45

Depth(s): All
Rates (gpm): 3
Purged Volume: 90
DTW After Purging: 48.04
Yield Rate: L - M - H H
Purge Observations:

DTW Before Sampling: 48.04
Sample Date/Time: 13-Jan 13:00
Sampling Method: Teflon Bailer
Sampling Depth(s): TOC
DTW After Sampling: 48.04
Chain-of-Custody No.(s): B94816
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	14.2	5.9	283	5
End	14.0	6.2	296	50

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.

See Table D-3.

Comments:

Air Temp: 20-30
Weather Conditions: overcast, breezy, occassional snow

Crew Chief Signature E Hollister Date: 3-7-00

+Disk No.: \\Lms-srvr1\data\HazWaste\JOBS\600\650-426 NCIA Jan-00\well sampling list and logs JANUARY 2000.xls EW-1B 3/8/2000 1:13:26 PM+

LMS Well Sampling Log

Date: 1/10/2000
Crew: EH, LR, DK
Job No: 650-426
Project: NCIA Well Sampling
Project Site: FLOWER

METERS USED

Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: Monitek

Early warning well 1 deep

Well ID No.: EW-1C
Well Condition: good
Well Depth/Diameter: 516 4
Well Casing Type: carbon steel
Screened Interval: bottom 10
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): -
Water Column Ht./Vol.: -
Purge Est.: 1000
Purge Method(s): dedicatedgrundfos
Purge Date/Time(s): 1/10/2000 12:00-13:10

Depth(s): -
Rates (gpm): 15
Purged Volume: 1000
DTW After Purging: -
Yield Rate: L - M - H **H**
Purge Observations:

DTW Before Sampling: -
Sample Date/Time: 10-Jan 13:30
Sampling Method: dedicated HDPE tubing
Sampling Depth(s): -
DTW After Sampling: -
Chain-of-Custody No.(s): B94801
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	12.0	7.0	116	10
End	12.1	6.6	115	5

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.

See Table D-3.

Comments:
EH miscalculated frequency of purge volumes

Air Temp: 40-50s
Weather Conditions: rain, wind

Crew Chief Signature E. Hollrah Date: 3-7-00

+Disk No.: \\Lms-srvr1\data\HazWaste\JOBS\600\650-426 NCIA Jan-00\well sampling list and logs JANUARY 2000.xls EW-1C 3/8/2000 1:13:43 PM+

LMS Well Sampling Log

Date: 1/13/2000
Crew: EH, JP, DK
Job No: 650-426
Project: NCIA Well Sampling
Project Site: ASTER

METERS USED

Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: Monitek

Early warning well 2 shallower

Well ID No.: EW-2B
Well Condition: good
Well Depth/Diameter: 142.00 2
Well Casing Type: PVC
Screened Interval: BOTTOM 10'
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 49.32
Water Column Ht./Vol.: 92.68 23.9
Purge Est.: 72
Purge Method(s): Grundfos
Purge Date/Time(s): 1/13/2000 14:25-15:06

Depth(s): All
Rates (gpm): 2
Purged Volume: 72
DTW After Purging: 49.32
Yield Rate: L - M - H **H**
Purge Observations:

DTW Before Sampling: 49.32
Sample Date/Time: 13-Jan 15:15
Sampling Method: Teflon Bailer
Sampling Depth(s): TOC
DTW After Sampling: 49.32
Chain-of-Custody No.(s): B94817
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	14.6	5.7	240	4
End	14.4	6.6	254	15

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.

See Table D-3.

Comments:

Air Temp: 20-30
Weather Conditions: overcast, breezy, occassional snow

Crew Chief Signature EHollist Date: 3-7-00

+Disk No.: \\Lms-srvr1\data\HazWaste\JOBS\600\650-426 NCIA Jan-00\well sampling list and logs JANUARY 2000.xls EW-2B 3/8/2000 1:13:53 PM+

LMS Well Sampling Log

Date: 1/10/2000
Crew: EH, LR, DK
Job No: 650-426
Project: NCIA Well Sampling
Project Site: ASTER

Early warning well 2 deep

Well ID No.: EW-2C
Well Condition: GOOD
Well Depth/Diameter: 500.00 4
Well Casing Type: CARBON STEEL
Screened Interval: BOTTOM 10'
Casing Ht./Lock No.: -
Reference Pt.: -
Depth to Water (DTW): -
Water Column Ht./Vol.: -
Purge Est.: 1200
Purge Method(s): dedicatedgrundfos
Purge Date/Time(s): 1/10/2000 14:30-16:00

Depth(s): -
Rates (gpm): 15
Purged Volume: 1200
DTW After Purging: -
Yield Rate: L - M - H H
Purge Observations:

METERS USED

Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: Monitek

DTW Before Sampling: -
Sample Date/Time: 10-Jan 16:20
Sampling Method: DEDICATED TUBING
Sampling Depth(s): -
DTW After Sampling: -
Chain-of-Custody No.(s): B94802 B94803
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	12.6	6.9	57	5
End	12.9	6.9	59	10

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.

See Table D-3.
400 - rusty colored

Comments:
B94803 blind dup 17:00

Air Temp: 40s
Weather Conditions: rain, wind

Crew Chief Signature E Hollert Date: 3-7-00

+Disk No.: \\Lms-srvr1\data\HazWaste\JOBS\600\650-426 NCIA Jan-00\well sampling list and logs JANUARY 2000.xls EW-2C 3/8/2000 1:14:05 PM+

R2-0000837

LMS Well Sampling Log

Date: 1/17/2000
Crew: EH, JP, DK, MB
Job No: 650-426
Project: NCIA Well Sampling
Project Site: 57 KINKLE

METERS USED

Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: Monitek

Well ID No.: FLMW-205B
Well Condition: GOOD
Well Depth/Diameter: 110.00 2
Well Casing Type: PVC
Screened Interval: BOTTOM 10'
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 53.42
Water Column Ht./Vol.: 56.58 18.0
Purge Est.: 54.1
Purge Method(s): Grundfos
Purge Date/Time(s): 1/17/2000

Depth(s): All
Rates (gpm): 2
Purged Volume: 60
DTW After Purging: 53.42
Yield Rate: L - M - H **H**
Purge Observations:

DTW Before Sampling: 53.42
Sample Date/Time: 17-Jan 12:10
Sampling Method: Teflon Bailer
Sampling Depth(s): TOC
DTW After Sampling: 53.42
Chain-of-Custody No.(s): B94823
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	12.9	5.0	288	4
End	11.9	5.7	304	20

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.

See Table D-3.

Comments:
equipment freezing

Air Temp: 10's or less
Weather Conditions: sunny, windy

Crew Chief Signature *E Hollrith* Date: *3-7-00*

+Disk No.: \\Lms-srvr1\data\HazWaste\JOBS\600\650-426 NCIA Jan-00\well sampling list and logs JANUARY 2000.xls FLMW-205B 3/8/2000 1:14:10 PM+

R2-0000838

LMS Well Sampling Log

Date: 1/13/2000
Crew: EH, DK
Job No: 650-426
Project: NCIA Well Sampling
Project Site: Off-Site middle of parking lot

METERS USED
Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: Monitek

Well ID No.: FSMW-6A
Well Condition: New
Well Depth/Diameter: 70.00 2
Well Casing Type: PVC
Screened Interval: Bottom 10'
Casing Ht./Lock No.: Flush Mounted
Reference Pt.: Mark on PVC
Depth to Water (DTW): 51.60
Water Column Ht./Vol.: 18.40 11.8
Purge Est.: 36
Purge Method(s): Grundfos
Purge Date/Time(s): 1/13/2000 08:31-09:07

Depth(s): All
Rates (gpm): 1
Purged Volume: 36
DTW After Purging: 51.6
Yield Rate: L - M - H **H**
Purge Observations:

DTW Before Sampling: 51.60
Sample Date/Time: 13-Jan 9:45
Sampling Method: Teflon Bailer
Sampling Depth(s): TOC
DTW After Sampling: 51.60
Chain-of-Custody No.(s): B94814
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	16.6	6.3	204	5
End	16.6	7.0	70	45

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.

See Table D-3.

Comments:

Air Temp: 20-30
Weather Conditions: overcast, breezy, occassional snow

Crew Chief Signature: E. Hollister Date: 3-7-00

+Disk No.: \\Lms-srvr1\data\HazWaste\JOBS\600\650-426 NCIA Jan-00\well sampling list and logs JANUARY 2000.xls FSMW-6A 3/8/2000 1:18:15 PM+

LMS Well Sampling Log

Date: 1/13/2000
Crew: EH, JP, DK
Job No: 650-426
Project: NCIA Well Sampling
Project Site: Off-Site

METERS USED
Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: Monitek

Well ID No.: FSMW-6B
Well Condition: New
Well Depth/Diameter: 149.15 2
Well Casing Type: PVC
Screened Interval: Bottom 10'
Casing Ht./Lock No.: Flush Mounted
Reference Pt.: Mark on PVC
Depth to Water (DTW): 52.00
Water Column Ht./Vol.: 97.15 24.7
Purge Est.: 74
Purge Method(s): Grundfos
Purge Date/Time(s): 1/13/2000 10:15-10:53

Depth(s): All
Rates (gpm): 2
Purged Volume: 75
DTW After Purging: 52
Yield Rate: L - M - H H
Purge Observations:

DTW Before Sampling: 52.00
Sample Date/Time: 13-Jan 11:00
Sampling Method: Teflon Bailer
Sampling Depth(s): TOC
DTW After Sampling: 52.00
Chain-of-Custody No.(s): B94815
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	14.3	5.4	312	6
End	15.9	6.0	272	75

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.

See Table D-3.

Comments:

Air Temp: 20-30
Weather Conditions: overcast, breezy, occassional snow

Crew Chief Signature E Hollist Date: 3-7-00

+Disk No.: \\Lms-srvr1\data\HazWaste\JOBS\600\650-426 NCIA Jan-00\well sampling list and logs JANUARY 2000.xls FSMW-6B 3/8/2000 1:18:21 PM+

LMS Well Sampling Log

Date: 1/12/2000
Crew: EH, LR, DK
Job No: 650-426
Project: NCIA Well Sampling
Project Site: Off Site (Chase)

METERS USED

Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: Monitek

Well ID No.: FSMW-7A
Well Condition: New
Well Depth/Diameter: 69.65 2
Well Casing Type: PVC
Screened Interval: Bottom 10'
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 54.39
Water Column Ht./Vol.: 15.61 11.4
Purge Est.: 36
Purge Method(s): Grundfos
Purge Date/Time(s): 1/12/2000 08:24-09:00

Depth(s): All
Rates (gpm): 1
Purged Volume: 36
DTW After Purging: 54.38
Yield Rate: L - M - H
Purge Observations:
water silty, then clear

DTW Before Sampling: 54.39
Sample Date/Time: 12-Jan 9:15
Sampling Method: Teflon Bailer
Sampling Depth(s): TOC
DTW After Sampling: 54.39
Chain-of-Custody No.(s): B94810
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	16.5	6.4	273	5
End	15.9	6.6	178	>100

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.

See Table D-3.

Comments:

Air Temp: 40-50
Weather Conditions: sunny, breezy
breezy, with gusts

Crew Chief Signature E Hollister Date: 3-7-00

+Disk No.: \\Lms-srvr1\data\HazWaste\JOBS\600\650-426 NCIA Jan-00\well sampling list and logs JANUARY 2000.xls FSMW-7A 3/8/2000 1:18:30 PM+

LMS Well Sampling Log

Date: 1/12/2000
Crew: EH, LR, DK
Job No: 650-426
Project: NCIA Well Sampling
Project Site: Off Site (Chase)

METERS USED

Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: Monitek

Well ID No.: FSMW-7B
Well Condition: New
Well Depth/Diameter: 148.25 2
Well Casing Type: PVC
Screened Interval: Bottom 10'
Casing Ht./Lock No.: Flush Mounted
Reference Pt.: Mark on PVC
Depth to Water (DTW): 54.40
Water Column Ht./Vol.: 94.75 24.3
Purge Est.: 73
Purge Method(s): Grundfos
Purge Date/Time(s): 1/12/2000 09:46-10:24

Depth(s): All
Rates (gpm): 2
Purged Volume: 75
DTW After Purging: 54.4
Yield Rate: L - M - H H
Purge Observations:

DTW Before Sampling: 54.40
Sample Date/Time: 12-Jan 10:55
Sampling Method: Teflon Bailer
Sampling Depth(s): TOC
DTW After Sampling: 54.40
Chain-of-Custody No.(s): B94811
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	15.2	7.2	218	5
End	15.6	7.3	216	60

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.

See Table D-3.

Comments:

Air Temp: 40-50
Weather Conditions: sunny, breezy

Crew Chief Signature E Hollrith Date: 3-7-00

+Disk No.: \\Lms-srvr1\data\HazWaste\JOBS\600\650-426 NCIA Jan-00\well sampling list and logs JANUARY 2000.xls FSMW-7B 3/8/2000 1 18:35 PM+

LMS Well Sampling Log

Date: 1/11/2000
Crew: LR, DK
Job No: 650-426
Project: NCIA Well Sampling
Project Site: 2360 SALISBURY

METERS USED

Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: Monitek

Well ID No.: NRMW-1
Well Condition: NEW
Well Depth/Diameter: 70.36 2
Well Casing Type: PVC
Screened Interval: BOTTOM 10'
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 43.53
Water Column Ht./Vol.: 26.83 13.2
Purge Est.: 39.6
Purge Method(s): Grundfos
Purge Date/Time(s): 1/11/2000 8:41-9:24

Depth(s): All
Rates (gpm): 1
Purged Volume: 42
DTW After Purging: 43.55
Yield Rate: L - M - H H
Purge Observations:

DTW Before Sampling: 43.55
Sample Date/Time: 11-Jan 9:45
Sampling Method: Teflon Bailer
Sampling Depth(s): TOC
DTW After Sampling: 43.55
Chain-of-Custody No.(s): B94804
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	14.4	4.8	151	5
End	14.5	5.5	142	

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.

See Table D-3.

Comments:

Air Temp: 45° F
Weather Conditions: overcast, drizzle
slightly windy

Crew Chief Signature E Hollister Date: 3-7-00

+Disk No.: \\Lms-srvr1\data\HazWaste\JOBS\600\650-426 NCIA Jan-00\well sampling list and logs JANUARY 2000.xls NRMW-1 3/8/2000 1:18:51 PM+

R2-0000843

LMS Well Sampling Log

Date: 1/11/2000
Crew: LR, DK
Job No: 650-426
Project: NCIA Well Sampling
Project Site: 1018 BOWLING GREEN DR.

METERS USED

Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: Monitek

Well ID No.: NRMW-2
Well Condition: NEW
Well Depth/Diameter: 70.20 2
Well Casing Type: PVC
Screened Interval: BOTTOM 10'
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 49.00
Water Column Ht./Vol.: 21.20 12.3
Purge Est.: 36.8
Purge Method(s): Grundfos
Purge Date/Time(s): 1/11/2000 12:34-13:16

Depth(s): All
Rates (gpm): 1
Purged Volume: 42
DTW After Purging: 49.4
Yield Rate: L - M - H H
Purge Observations:

DTW Before Sampling: 49.40
Sample Date/Time: 11-Jan 13:45
Sampling Method: Teflon Bailer
Sampling Depth(s): TOC
DTW After Sampling: 49.40
Chain-of-Custody No.(s): B94805
Analytical Lab(s): H2M
Sampling Observations: clear

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	15.3	4.5	226	55
End	14.1	5.5	216	20

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.

See Table D-3.

Comments:

Air Temp: 45° F
Weather Conditions: overcast, drizzle
slightly windy

Crew Chief Signature E. Hollister Date: 3-7-00

+Disk No.: \\Lms-srvr1\data\HazWaste\JOBS\600\650-426 NCIA Jan-00\well sampling list and logs JANUARY 2000.xls NRMW-2 3/8/2000 1:18:57 PM+

R2-0000844

LMS Well Sampling Log

Date: 1/11/2000
Crew: LR, DK
Job No: 650-426
Project: NCIA Well Sampling
Project Site: 967 MERILLON

METERS USED

Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: Monitek

Well ID No.:	NRMW-3
Well Condition:	NEW
Well Depth/Diameter:	70.90 2
Well Casing Type:	PVC
Screened Interval:	BOTTOM 10'
Casing Ht./Lock No.:	
Reference Pt.:	TOC
Depth to Water (DTW):	42.68
Water Column Ht./Vol.:	28.22 13.4
Purge Est.:	40.3
Purge Method(s):	Grundfos
Purge Date/Time(s):	1/11/2000 10:39-11:23
Depth(s):	All
Rates (gpm):	1
Purged Volume:	42
DTW After Purging:	42.75
Yield Rate: L - M - H	**H**
Purge Observations:	

DTW Before Sampling:	42.70
Sample Date/Time:	11-Jan 12:00
Sampling Method:	Teflon Bailer
Sampling Depth(s):	TOC
DTW After Sampling:	42.70
Chain-of-Custody No.(s):	B94806
Analytical Lab(s):	H2M
Sampling Observations:	

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	15.1	6.4	89	5
End	14.6	6.4	89	

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.

See Table D-3.

Comments:

Air Temp: 45° F
Weather Conditions: overcast, drizzle
slightly windy

Crew Chief Signature E Hollister Date: 3-7-00

+Disk No.: \\Lms-srvr1\data\HazWaste\JOBS\600\650-426 NCIA Jan-00\well sampling list and logs JANUARY 2000.xls NRMW-3 3/8/2000 1:19:08 PM+

LMS Well Sampling Log

Date: 1/11/2000
Crew: LR, DK
Job No: 650-426
Project: NCIA Well Sampling
Project Site: 1145 ROXBURY

METERS USED
Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: Monitek

Well ID No.: NRMW-4
Well Condition: NEW
Well Depth/Diameter: 70.60 2
Well Casing Type: PVC
Screened Interval: BOTTOM 10'
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 44.79
Water Column Ht./Vol.: 25.81 13.0
Purge Est.: 39.1
Purge Method(s): Grundfos
Purge Date/Time(s): 1/11/2000 14:30-15:14

Depth(s): All
Rates (gpm): 1
Purged Volume: 42
DTW After Purging: 44.8
Yield Rate: L - M - H H
Purge Observations:

DTW Before Sampling: 44.79
Sample Date/Time: 11-Jan 15:30
Sampling Method: Teflon Bailer
Sampling Depth(s): TOC
DTW After Sampling: 44.79
Chain-of-Custody No.(s): B94807
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	14.4	5.5	77	7
End	14.4	6.2	86	12

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.

See Table D-3.

Comments:

Air Temp: 45° F
Weather Conditions: overcast, drizzle
slightly windy

Crew Chief Signature E Hellsth Date: 3-7-00

+Disk No.: \\Lms-srvr1\data\HazWaste\JOBS\600\650-426 NCIA Jan-00\well sampling list and logs JANUARY 2000.xls NRMW-4 3/8/2000 1:19:12 PM+

LMS Well Sampling Log

Date:
Crew: EH, JP, DK
Job No: 650-426
Project: NCIA Well Sampling
Project Site: 675 Brooklyn

METERS USED

Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: Monitek

Well ID No.: N-9938
Well Condition: FAIR-Poor
Well Depth/Diameter: 70.56 4
Well Casing Type: PVC
Screened Interval: Bottom 5 + 3 sump
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 55.10
Water Column Ht./Vol.: 15.46 20.4
Purge Est.: 61.1
Purge Method(s): Grundfos
Purge Date/Time(s): 1/14/2000 11:05-12:06

Depth(s): All
Rates (gpm): 1
Purged Volume: 61
DTW After Purging: 70.58
Yield Rate: L - M - H **M**
Purge Observations:

DTW Before Sampling:
Sample Date/Time: 14-Jan 12:30
Sampling Method: Teflon Bailer
Sampling Depth(s): TOC
DTW After Sampling:
Chain-of-Custody No.(s): B94821
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	14.6	5.1	405	3
End	14.1	5.4	281	20

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.

See Table D-3.

Comments:

Air Temp: 10's
Weather Conditions: sunny, windy

Crew Chief Signature E Hollister Date: 3-7-00

+Disk No.: \\Lms-srvr1\data\HazWaste\JOBS\600\650-426 NCIA Jan-00\well sampling list and logs JANUARY 2000.xls N-9938 3/8/2000 1:19:24 PM+

LMS Well Sampling Log

Date: 1/18/2000
Crew: JP, DK, MB
Job No: 650-426
Project: NCIA Well Sampling
Project Site: Magnolia and Grand

METERS USED

Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: Monitek

Well ID No.: N-10324
Well Condition: FAIR
Well Depth/Diameter: 54.60 2
Well Casing Type: PVC
Screened Interval: BOTTOM 10'
Casing Ht./Lock No.: FLUSH
Reference Pt.: TOC
Depth to Water (DTW): 50.60
Water Column Ht./Vol.: 4.00 3.6
Purge Est.: 10.80
Purge Method(s): teflon bailer
Purge Date/Time(s): 1/18/2000 15:00-15:30

Depth(s): All
Rates (gpm): 0.6
Purged Volume: 12
DTW After Purging: 50.6
Yield Rate: L - M - H
Purge Observations:

DTW Before Sampling: 50.6
Sample Date/Time: 18-Jan 15:45
Sampling Method: Teflon Bailer
Sampling Depth(s): TOC
DTW After Sampling: 50.6
Chain-of-Custody No.(s): B94826
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	12.1	6.3	427	4
End	12.6	5.7	426	5

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.

See Table D-3.

Comments:

Air Temp: 0-10
Weather Conditions: sunny, breezy

Crew Chief Signature E. Hollister Date: 3-7-00

+Disk No.: \\Lms-srvr1\data\HazWaste\JOBS\600\650-426 NCIA Jan-00\well sampling list and logs JANUARY 2000.xls N-10324 3/8/2000 1:19:34 PM+

LMS Well Sampling Log

Date: 1/18/2000
Crew: JP, DK, MB
Job No: 650-426
Project: NCIA Well Sampling
Project Site: Swalm

ACROSS STREET AND SOUTH OF 80 SWALM

Well ID No.: N-10325
Well Condition: GOOD
Well Depth/Diameter: 55.30 2
Well Casing Type: PVC
Screened Interval: BOTTOM 10'
Casing Ht./Lock No.: FLUSH
Reference Pt.: TOC
Depth to Water (DTW): 51.93
Water Column Ht./Vol.: 3.37 3.0
Purge Est.: 9
Purge Method(s): Teflon Bailer
Purge Date/Time(s): 1/18/2000 11:00-11:25

Depth(s): All
Rates (gpm): 0.6
Purged Volume: 9
DTW After Purging: 51.93
Yield Rate: L - M - H
Purge Observations:

METERS USED

Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: Monitek

DTW Before Sampling: 51.93
Sample Date/Time: 18-Jan 11:50
Sampling Method: Teflon Bailer
Sampling Depth(s): TOC
DTW After Sampling: 51.93
Chain-of-Custody No.(s): B94828
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	12.1	6.1	164	5
End	12.8	6.6	137	>100

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.

See Table D-3.

Comments:

Air Temp: 0-10
Weather Conditions: sunny, breezy

Crew Chief Signature 3-7-00 Date: 3-7-00

+Disk No.: \\Lms-srvr1\data\HazWaste\JOBS\600\650-426 NCIA Jan-00\well sampling list and logs JANUARY 2000.xls N-10325 3/8/2000 1:19:40 PM+

R2-0000849

LMS Well Sampling Log

Date:	1/18/2000	**METERS USED**	
Crew:	JP, DK, MB	Temp.:	DEC 560
Job No:	650-426	pH:	DEC 4-99-03
Project:	NCIA Well Sampling	Cond.:	DEC 560
Project Site:	979 OCR (NY AVE)	Turb.:	Monitek

Well ID No.:	N-10328	DTW Before Sampling:	50.7
Well Condition:	FAIR	Sample Date/Time:	18-Jan 9:45
Well Depth/Diameter:	53.80 2	Sampling Method:	Teflon Bailer
Well Casing Type:	PVC	Sampling Depth(s):	TOC
Screened Interval:	BOTTOM 10'	DTW After Sampling:	50.7
Casing Ht./Lock No.:		Chain-of-Custody No.(s):	B94825
Reference Pt.:	TOC	Analytical Lab(s):	H2M
Depth to Water (DTW):	50.70	Sampling Observations:	
Water Column Ht./Vol.:	3.10 2.8		
Purge Est.:	8.3		
Purge Method(s):	Teflon Bailer		
Purge Date/Time(s):	1/18/2000 08:45-09:35		
Depth(s):	All		
Rates (gpm):	0.5		
Purged Volume:	9		
DTW After Purging:	50.7		
Yield Rate:	L - M - H		
Purge Observations:			

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	13.9	6.0	261	>100
End	13.3	5.9	302	>100

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.

See Table D-3.

Comments:

Air Temp: 0-10

Weather Conditions: sunny, breezy

Crew Chief Signature E. Hollert Date: 3.7.00

+Disk No : \\Lms-srvr1\data\HazWaste\JOBS\600\650-426 NCIA Jan-00\well sampling list and logs JANUARY 2000.xls N-10328 3/8/2000 1:20:02 PM+

LMS Well Sampling Log

Date: 1/17/2000
Crew: JP, DK
Job No: 650-426
Project: NCIA Well Sampling
Project Site: 17 BROOKLYN

METERS USED
Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: Monitek

Well ID No.: N-10470
Well Condition: GOOD
Well Depth/Diameter: 64.90 2
Well Casing Type: PVC
Screened Interval: BOTTOM 10'
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 53.85
Water Column Ht./Vol.: 11.00 9.9
Purge Est.: 30
Purge Method(s): Grundfos
Purge Date/Time(s): 1/17/2000 13:30-14:00

Depth(s): All
Rates (gpm): 1
Purged Volume: 30
DTW After Purging: 54.06
Yield Rate: L - M - H
Purge Observations:

DTW Before Sampling: 53.88
Sample Date/Time: 17-Jan 14:30
Sampling Method: Teflon Bailer
Sampling Depth(s): TOC
DTW After Sampling: 53.88
Chain-of-Custody No.(s): B94827
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	14.3	5.5	329	>100
End	13.8	6.8	358	>100

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.

See Table D-3.

Comments:
equipment freezing

Air Temp: 10's or less
Weather Conditions: sunny, windy

Crew Chief Signature E Hollist Date: 3-7-00

+Disk No.: \\Lms-srvr1\data\HazWaste\JOBS\600\650-426 NCIA Jan-00\well sampling list and logs JANUARY 2000.xls N-10470 3/8/2000 1:20:47 PM+

R2-0000851

LMS Well Sampling Log

Date:	
Crew:	EH, JP, DK
Job No:	650-426
Project:	NCIA Well Sampling
Project Site:	2548 Astor

METERS USED

Temp.:	DEC 560
pH:	DEC 4-99-03
Cond.:	DEC 560
Turb.:	Monitek

Well ID No.:	N-10474	
Well Condition:	FAIR	
Well Depth/Diameter:	60.00	2
Well Casing Type:	PVC SCH 80	
Screened Interval:	BOTTOM 10'	
Casing Ht./Lock No.:		
Reference Pt.:	TOC	
Depth to Water (DTW):	49.45	
Water Column Ht./Vol.:	10.55	9.5
Purge Est.:	28.4	
Purge Method(s):	Grundfos	
Purge Date/Time(s):	1/13/2000 15:35-16:05	
Depth(s):	All	
Rates (gpm):	1	
Purged Volume:	30	
DTW After Purging:	49.5	
Yield Rate: L - M - H	H	
Purge Observations:		

DTW Before Sampling:	49.50	
Sample Date/Time:	13-Jan	16:35
Sampling Method:	Teflon Bailer	
Sampling Depth(s):	TOC	
DTW After Sampling:	49.48	
Chain-of-Custody No.(s):	B94818	
Analytical Lab(s):	H2M	
Sampling Observations:		

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	15.5	5.7	325	15
End	14.4	6.2	274	>100

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.

See Table D-3.

Comments:

Air Temp: 20-30

Weather Conditions: overcast, breezy, occassional snow

Crew Chief Signature E. Hellrich Date: 3.7.00

+Disk No.: \\Lms-srvr1\data\HazWaste\JOBS\600\650-426 NCIA Jan-00\well sampling list and logs JANUARY 2000.xls N-10474 3/8/2000 1:20:53 PM+

LMS Well Sampling Log

Date: 1/12/2000
Crew: EH, LR, DK
Job No: 650-426
Project: NCIA Well Sampling
Project Site: BARRINGTON ST

METERS USED
Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: Monitek

Well ID No.: N-10477
Well Condition: GOOD
Well Depth/Diameter: 62.50 2
Well Casing Type: PVC
Screened Interval: BOTTOM 10'
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 46.60
Water Column Ht./Vol.: 15.90 11.4
Purge Est.: 35
Purge Method(s): Grundfos
Purge Date/Time(s): 1/12/2000 11:52-12:28

Depth(s): All
Rates (gpm): 1
Purged Volume: 36
DTW After Purging: 46.38
Yield Rate: L - M - H
Purge Observations:

DTW Before Sampling: 46.60
Sample Date/Time: 12-Jan 13:00
Sampling Method: Teflon Bailer
Sampling Depth(s): TOC
DTW After Sampling: 46.60
Chain-of-Custody No.(s): b94812
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	16.5	5.1	554	5
End	15.3	5.2	553	>100

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.

See Table D-3.

Comments:
water up & over cover of well

Air Temp: 40-50
Weather Conditions: sunny, breezy
low-med humid

Crew Chief Signature E. Hallett Date: 3-7-00

+Disk No.: \\Lms-srvr1\data\HazWaste\JOBS\600\650-426 NCIA Jan-00\well sampling list and logs JANUARY 2000.xls N-10477 3/8/2000 1:21:03 PM+

LMS Well Sampling Log

Date: 1/12/2000
Crew: EH, DK
Job No: 650-426
Project: NCIA Well Sampling
Project Site: BARRINGTON ST

METERS USED

Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: Monitek

Well ID No.: N-10478
Well Condition: POOR
Well Depth/Diameter: 121.00 4
Well Casing Type: PVC SCH 80
Screened Interval: 100-121'
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 46.50
Water Column Ht./Vol.: 74.50 72.3
Purge Est.: 220
Purge Method(s): Grundfos
Purge Date/Time(s): 1/12/2000 13:40-14:55

Depth(s): All
Rates (gpm): 3
Purged Volume: 225
DTW After Purging: 46.5
Yield Rate: L - M - H H
Purge Observations:

DTW Before Sampling: 46.50
Sample Date/Time: 12-Jan 15:30
Sampling Method: Teflon Bailer
Sampling Depth(s): TOC
DTW After Sampling: 46.50
Chain-of-Custody No.(s): B94813
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	14.8	5.1	206	5
End	15.1	5.2	211	14

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.

See Table D-3.

Comments:

Air Temp: 40-50
Weather Conditions: sunny, breezy

Crew Chief Signature E Hollister Date: 3-7-00

+Disk No.: \\Lms-srvr1\data\HazWaste\JOBS\600\650-426 NCIA Jan-00\well sampling list and logs JANUARY 2000.xls N-10478 3/8/2000 1:21:14 PM+

LMS Well Sampling Log

Date: 1/14/2000
Crew: EH, JP, DK
Job No: 650-426
Project: NCIA Well Sampling
Project Site: OLIVER & GRAND

METERS USED

Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: Monitek

Well ID No.: N-11851
Well Condition: Fair
Well Depth/Diameter: 62.50 2
Well Casing Type: PVC
Screened Interval: BOTTOM 10'
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 51.60
Water Column Ht./Vol.: 10.90 9.8
Purge Est.: 29.4
Purge Method(s): Whale
Purge Date/Time(s): 1/14/2000 08:30-09:00

Depth(s): All
Rates (gpm): 1
Purged Volume: 30
DTW After Purging: 51.8
Yield Rate: L - M - H **H**
Purge Observations: clear

DTW Before Sampling: 51.60
Sample Date/Time: 14-Jan 9:30
Sampling Method: Teflon Bailer
Sampling Depth(s): TOC
DTW After Sampling: 51.60
Chain-of-Custody No.(s): B94820
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	13.6	6.5	234	4
End	12.8	7.6	249	>100

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.

See Table D-3.

Comments:

Air Temp: 10's
Weather Conditions: sunny, windy

Crew Chief Signature E Hollister Date: 3-7-00

+Disk No.: \\Lms-srvr1\data\HazWaste\JOBS\600\650-426 NCIA Jan-00\well sampling list and logs JANUARY 2000.xls N-11851 3/8/2000 1:21:24 PM+

LMS Well Sampling Log

Date: 1/18/2000
Crew: JP, DK, MB
Job No: 650-426
Project: NCIA Well Sampling
Project Site: 989 OCR (BROOKLYN)

METERS USED

Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: Monitek

Well ID No.: N-11855
Well Condition: FAIR
Well Depth/Diameter: 64.20 2
Well Casing Type: PVC
Screened Interval:
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 51.90
Water Column Ht./Vol.: 12.30 10.8
Purge Est.: 32.5
Purge Method(s): Grundfos
Purge Date/Time(s): 1/18/2000 13:00-13:36

Depth(s): All
Rates (gpm): 1
Purged Volume: 36
DTW After Purging: 51.90
Yield Rate: L - M - H
Purge Observations:

DTW Before Sampling: 51.90
Sample Date/Time: 18-Jan 14:15
Sampling Method: Teflon Bailer
Sampling Depth(s): TOC
DTW After Sampling: 51.90
Chain-of-Custody No.(s): B94824
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	14.4	5.7	327	4
End	13.7	5.9	420	>100

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.

See Table D-3.

Comments:

Air Temp: 0-10
Weather Conditions: sunny, breezy

Crew Chief Signature E Hollist Date: 3-7-00

+Disk No.: \\Lms-srvr1\data\HazWaste\JOBS\600\650-426 NCIA Jan-00\well sampling list and logs JANUARY 2000.xls N-11855 3/8/2000 1:21:31 PM+

LMS Well Sampling Log

Date: 1/17/2000
Crew: JP, DK
Job No: 650-426
Project: NCIA Well Sampling
Project Site: 2541 ASTER

METERS USED

Temp.: DEC 560
pH: DEC 4-99-03
Cond.: DEC 560
Turb.: Monitek

Well ID No.: N-11860
Well Condition: FAIR
Well Depth/Diameter: 60.15 2
Well Casing Type: PVC
Screened Interval: BOTTOM 5'
Casing Ht./Lock No.:
Reference Pt.: TOC
Depth to Water (DTW): 48.87
Water Column Ht./Vol.: 11.28 7.0
Purge Est.: 20.9
Purge Method(s): Grundfos
Purge Date/Time(s): 1/17/2000 15:25-15:55

Depth(s): All
Rates (gpm): 1
Purged Volume: 30
DTW After Purging: 48.87
Yield Rate: L - M - H
Purge Observations:

DTW Before Sampling: 48.87
Sample Date/Time: 17-Jan 16:20
Sampling Method: Teflon Bailer
Sampling Depth(s): TOC
DTW After Sampling: 48.87
Chain-of-Custody No.(s): B94829
Analytical Lab(s): H2M
Sampling Observations:

SAMPLE CHEMISTRIES

	Temp. (°C)	pH	Sp. Cond.	Turb.
Start	14.3	5.3	140	4
End	13.7	5.5	143	>100

SAMPLE ANALYSES

Parameters	Inv. No.	Pres. Meth.	Filter

PURGE CHEMISTRIES

Vol.	Temp. (°C)	pH	Sp. Cond.	Turb.

See Table D-3.

Comments:
equipment freezing

Air Temp: 10's or less
Weather Conditions: sunny, windy

Crew Chief Signature E Hollister Date: 3-7-00

+Disk No.: \\Lms-srvr1\data\HazWaste\JOBS\600\650-426 NCIA Jan-00\well sampling list and logs JANUARY 2000.xls N-11860 3/8/2000 1:21:41 PM+

Table [illegible]

Purge Chemistries
January 2000
(Page 1 of 3)

NYSDEC Greensheet Number	Well ID		Volume	Alkalinity	Chloride	Dissolved Oxygen	Conductivity	ORP	pH	Temperature	Turbidity	Hardness	Notes	Dissolved Oxygen	ORP	Fe^{2+}	filtered?
B94816	**EW-1B**	1	0	0/20	45	0.9	282	260	6.0	13.2	7	31	NA - water too turbid to see any color change				
13-Jan			0.5			1.0	280	255	5.8	14.3	7			1.6	300	0	no
13:00			1	0/25	55	1.0	280	260	6.0	14.0	4	XX					
			1.5			1.3	281	260	5.9	14.6	5						
			2	0/25	25	1.0	283	255	5.9	14.1	60	41					
			2.5			1.0	283	265	5.8	14.3	7						
			3	0/25	40	1.0	283	265	5.9	14.2	5	XX					
B94801	**EW-1C**	2	0	20/30	20	2.2	150	125	9.5/9	14.0	15	21	miscalculated frequency of purge volumes				
10-Jan			250			2.1	114	155	8.9	12.0	45						
13:30			500	0/15	25	7.3	118	190	8.0	12.0	15	35					
			750			8.4	116	200	7.1	12.0	7						
			1000	0/15	20	9.0	116	210	7.3	12.0	10	32					
B94817	**EW-2B**	3	0	0/35	50	1.0	244	240	6.3	13.5	7	42					
13-Jan			0.5			1.0	244	255	5.8	14.4	8						
15:15			1	0/20	55	1.0	241	260	5.6	14.6	5	XX					
			1.5			0.9	240	260	5.5	14.8	5						
			2	0/20	55	1.0	240	260	5.5	14.6	4	46					
			2.5			1.1	243	275	5.7	14.7	5						
			3	0/20	55	1.0	240	280	5.7	14.6	4	XX					
B94802	**EW-2C**	4	0	15/25	20	2.7	108	120	9.5/9	13.9	55	14					
B94803			0.5			2.0	100	NA	10.1/	13.4	5						
10-Jan			1	0/20	15	7.8	63	160	8.1	12.5	>200	>35					
16:20			1.5			8.4	59	190	7.7	12.4	60						
17:00			2	0/15	30	8.4	58	200	7.6	12.5	30	22					
			2.5			8.6	58	200	7.4	12.5	10						
			3	0/15	20	8.8	57	205	6.9	12.6	5	18					
B94823	**FLMW-205B**	5	0	0/15	45	12.9	300	285	6.8	10.3	50	56	H				
12:10			0.5			1.5	286	290	5.2	12.6	7						
17-Jan			1	0/10	50	1.5	280	300	5.2/5	12.6	5	0	F	unfiltered			
			1.5			1.5	284	300	5.2	13.2	4						
			2	0/10	45	1.7-1.4	289	305	5.3	13.0	4	58	H				
			2.5			1.4	291	315	5.0	13.1	80						
			3	0/10	50	1.2	288	315	5.0	12.9	4	0	F	unfiltered			
B94814	**FSMW-6A**	6	0	0/35	25	6.6	85	255	7.6	14.5	>100	>40		9.3	245	0	no
13-Jan			0.5			6.6	114	250	6.8	16.3	>100						
9:45			1	0/25	30	7.0	155	255	6.3/6	16.5/16.6	70	XX					
			1.5			7.3	176	255	6.2	16.8	50						
			2	0/20	45	7.3	191	260	6.3	16.6	50	48					
			2.5			7.4	197	265	6.3	16.8	7						
			3	0/20	50	7.6	204	265	6.3	16.6	5	XX					
B94815	**FSMW-6B**	7	0	0/20	45	6.7	275	290	5.8	12.4	>100	60		5.1	265	0	no
13-Jan			0.5			6.3	299	295	5.7	14.4	>100						
11:00			1	0/15	50	6.0	305	295	5.7	14.4	40	XX					
			1.5			5.9	308	300	5.5	14.5	>100						
			2	0/15	50	5.6	312	290	5.4	14.4	50	71					
			2.5			5.6	312	290	5.7	14.3	60						
			3	0/15	50	5.4	312	290	5.4	14.3	6	XX					
B94810	**FSMW-7A**	8	0	0/30	25	7.3	197	210	7.7	14.0	>100	42					
12-Jan			0.5			7.3	238	235	7.4	16.2	70						
9:15			1	0/25	45	7.4	257	240	7.0	16.3	20	56					
			1.5			7.4	265	250	6.2/6	16.7	>100						
			2	0/30	45	7.3	267	255	6.2	16.1	15	60					
			2.5			7.4	271	255	6.3	16.7	7						
			3	0/30	40	7.4	273	266	6.4	16.5	5	57					

Table D-3
Purge Chemistries
January 2000

NYSDEC Greensheet Number		Well ID		Volume	Alkalinity	Chloride	Dissolved Oxygen	Conductivity	ORP	pH	Temperature	Turbidity	Hardness	Notes	Dissolved Oxygen	ORP	Fe^{2+}	filtered?
B94811		FSMW-7B	9	0	0/45	25	6.2	253	245	6.8	15.3	>100	26					
12-Jan				0.5			6.1	217	245	7.1	15.3	90						
10:55				1	0/40	30	6.4	213	245	7.1	15.3	40	48					
				1.5			6.1	217	240	7.2	15.2	40						
				2	0/40	35	6.1	217	235	7.2	15.3	15	49					
				2.5			6.1	217	230	7.3	15.4	14						
				3	0/40	30	6.2	218	240	7.2	15.2	5	46					
B94826	backup	N-10324	10	0	0/40	35	8.4	525	130	6.5	7.1	15	0	f				
18-Jan				0.5			8.4	501	140	6.5	9.4	4						
15:45				1	0/30	85	8.1	460	150	6.3	12.4	4	>60	h				
				1.5			8.1	460	175	6.4	11.1	4						
				2	0/30	80	8.2	475	175	6.6	10.8	4	0	f				
				2.5			8.0	460	180	6.5	11.9	3						
				3	0/30	80	8.0	467	200	6.3	12.1	4						
B94828	backup	N-10325	11	0	0/20	35	8.7	156	345	6.7	9.7	50	0	f				
18-Jan				0.5			8.5	151	345	6.2	11.2	30						
11:50				1	0/20	30	8.3	145	340	6.1	13.5	15	35	h				
				1.5			8.4	154	345	6.1	12.7	6						
				2	0/25	35	8.1	162	340	6.1	11.4	4	0	f				
				2.5			8.3	159	330	6.3	11.9	5						
				3	0/20	30	8.4	164	330	6.1	12.1	5	XX					
B94825		N-10328	14	0	0/15	80	7.6	317	265	6.9	12.0	>100	0	f				
18-Jan				0.5			7.4	203	295	6.7	11.9	>100						
9:45				1	0/20	45	7.4	239	305	6.2	12.5	>100	37	h				
				1.5			7.3	263	305	6.0	14.1	>100						
				2	0/15	60	7.2	280	310	5.9	14.0	>100	0	f	filtered			
				2.5			7.1	243	320	5.9	13.9	>100						
				3	0/20	55	7.3	261	330	6.0	13.9	>100	XX					
B94827		N-10470	15	0	0/20	45	12.6	357	270	6.5	11.3	>100	0	f				
17-Jan				0.5			12.9	330	275	6.8	14.3	>100						
14:30				1	0/15	55	12.6	327	280	6.6	13.7	>100	51	h				
				1.5			12.6	331	285	6.4	14.6	>100						
				2	0/15	65	12.6	328	290	5.5	14.5	>100	0	f				
				2.5			12.6	328	285	5.5	14.5	>100						
				3	0/15	50	12.5	329	285	5.5	14.3	>100	58	h				
B94818		N-10474	17	0	0/35	70	3.5	335	280	6.8	12.7	>100	>65		7.6	360	0	no
13-Jan				0.5			4.5	339	285	5.9	14.5	>100						
16:35				1	0/20	60	4.3	333	280	5.7	14.9	>100	XX					
				1.5			4.5	331	290	5.7	15.5	>100						
				2	0/25	65	4.3	327	285	5.6	15.3	70	64					
				2.5			4.5	326	285	5.6	15.6	40						
				3	0/20	65	4.4	325	280	5.7	15.5	15	XX					
B94812		N-10477	18	0	0/25	100	2.5	535	315	5 1/5	15.0	>100	83		3.3	240	0	no
12-Jan				0.5			2.6	549	315	5.1	16.4	>100						
13:00				1	0/25	100/120	2.4	553	315	5.1	16.5	40	83					
				1.5			2.3	556	320	5.1	16.7	>100						
				2	0/20	115	2.4	556	315	5.1	16.5	>100	86					
				2.5			2.2	556	320	5.1	16.0	10						
				3	0/15	110	2.3	554	320	5.1	16.5	5	XX					
B94813		N-10478	19	0	0/20	35	2.3	211	60	5.5	14.1	25	43		3.3	340	0	no
12-Jan				0.5			4.5	207	225	5.2	14.9	5						
15:30				1	0/15	40	5.4	207	265	5.2	14.9	5	XX					
				1.5			5.2	207	270	5.1	14.9	5						
				2	0/10	20	5.5	207	290	5.1	14.9	4	43					
				2.5			5.5	206	300	5.1	15.0	4						
				3	0/10	35	5.5	206	280	5.1	14.8	5	XX					

Tab...
Purge Chemistries
January 2000
(Page 3 of 3)

NYSDEC Greensheet Number	Well ID		Volume	Alkalinity	Chloride	Dissolved Oxygen	Conductivity	ORP	pH	Temperature	Turbidity	Hardness	Notes	Dissolved Oxygen	ORP	Fe^{2+}	filtered?
B94820	N-11851	21	0	0/80	60	8.2	283	260	7.5	11.7	50	>80		6.9	285	0	no
14-Jan			0.5			7.7	234	255	7.5	13.6	5						
9:30			1	0/35	40	7.4	231	260	7.1	13.2	4	XX					
			1.5			7.7	231	260	6.8	13.3	3						
			2	0/30	35	7.5	232	265	6.6	13.3	3	51					
			2.5			7.5	234	270	6.6	13.6	3						
			3	0/40	35	7.6	234	265	6.5	13.6	4						
B94824	N-11855	23	0	0/30	70	4.3	450	175	5.8	12.0	>100	2.55	f	filtered			
18-Jan			0.5			3.1	390	150	5.7/5.	13.6	15						
14:15			1	0/20	55	3.0	363	160	5.7	14.4	5	>60	h				
			1.5			3.2	351	165	5.7	14.5	5						
			2	0/20	55	3.1	345	155	5.7	14.2	4	2.4	f	filtered?			
			2.5			3.3	333	155	5.7	14.5	3						
			3	XX	XX	3.4	327	160	5.7	14.4	4						
B94829	N-11860	24	0	0/10	25	11.2	148	310	5.7	11.7	>100	0	f				
17-Jan			0.5			10.8	141	315	5.6	13.9	60						
16:20			1	0/10	30	10.7	141	315	5.4	14.0	4	41	h				
			1.5			10.7	140	315	5.4	14.1	5						
			2	0/10	30	10.8	140	315	5.4	14.4	4	0	f				
			2.5			10.8	141	315	5.5	14.2	4						
			3	0/10	30	10.7	140	315	5.3	14.3	4	XX					
B94821	N-9938	25	0	0/15	50	8.4	261	275	6.1	11.0	19	0	F	filtered			
14-Jan			0.5			8.2	415	280	5.2/5.	14.2	15						
12:30			1	0/10	75	8.3	407	275	5.1	14.7	7	>80	H				
			1.5			8.5	409	280	5.1	14.7	5						
			2	0/10	80	8.4	390	300	5.1	14.5	4	0	F	filtered			
			2.5			8.5	399	305	5.1	14.7	4						
			3	0/10	75	8.6	405	310	5.1	14.6	3	0	F	unfiltered			
B94804	NRMW-1	26	0	0/15	20	8.6	117	305	6.9	13.4	>100	44		6.6	345	0	no
11-Jan			0.5			8.4	151	320	5.1/5.	14.5	>100						
9:45			1	0/10	25	8.4	152	330	5.1	14.2	>100	40					
			1.5			8.4	150	335	4.9/4.	14.3	50						
			2	0/10	20	8.3	151	345	4.8	14.3	45	40					
			2.5			7.5	151	350	4.9	14.7	7						
			3	0/5	20	8.1	151	355	4.8	14.4	5	41					
B94805	NRMW-2	27	0	0/15	30	8.3	224	345	4.8/4.	14.4	>100	65		6.8	405	0	no
11-Jan			0.5			8.1	228	355	4.7	14.9	12						
13:45			1	0/10	30	8.5	228	375	4.7	14.9	7	58					
			1.5			8.5	225	375	4.7	15.0	>100						
			2	0/5	35	8.4	228	375	4.6	15.2	9	59					
			2.5			8.4	227	375	4.6	15.3	5						
			3	0/10	35	8.4	226	375	4.5	15.3	55	58					
B94806	NRMW-3	28	0	0/25	20	7.5	89	235	6.3	14.1	>100	17		7.5	115	0	no
11-Jan			0.5			7.8	88	235	6.3	14.3	40						
12:00			1	0/15	15	7.7	82	240	6.2	14.6	>100	16					
			1.5			7.8	89	250	6.8	14.7	7						
			2	0/15	20	7.6	89	250	6.2	14.8	60	18					
			2.5			7.6	89	265	6.3	15.2	5						
			3	0/20	20	7.8	89	275	6.4	15.1	5	15					
B94807	NRMW-4	29	0	NA	NA	7.9	85	305	5.5	13.4	>100	NA		8.4	405	0	no
11-Jan			0.5			8.5	80	315	5.1	14.6	>100						
15:30			1	0/10 0/20	15 20	8.5	79	330	5.4	13.9	17	25	high turned red, not pink/turned dark brown				
			1.5			8.4	77	325	5.1	14.2	60						
			2	0/10	15	8.5	79	335	5.1	14.6	10	25					
			2.5			8.4	77	330	5.1	14.3	60						
			3	0/10	20	8.4	77	325	5.5	14.4	7	27					

R2-0000860

Table D-4

Well Sampling List

January 2000

NYSDEC sample #	Well ID	depth	date	time	NOTES		
B94803	BD of EW-2C		10-Jan	17:00			
B94801	EW-1C	500	10-Jan	13:30	4"	dedicated	MS/MSD
B94802	EW-2C	500	10-Jan	16:20	4"	dedicated	BD B94803 17:00
B94808	TB-1		10-Jan	X			
B94804	NRMW-1	70.36	11-Jan	9:45		Grundfos	
B94805	NRMW-2	70.2	11-Jan	13:45		Grundfos	
B94806	NRMW-3	70.9	11-Jan	12:00		Grundfos	
B94807	NRMW-4	70.6	11-Jan	15:30		Grundfos	
B94810	FSMW-7A	70	12-Jan	9:15		Grundfos	
B94811	FSMW-7B	148	12-Jan	10:55		Grundfos	
B94812	N-10477	62.5	12-Jan	13:00		Grundfos	
B94813	N-10478	121	12-Jan	15:30	4"	Grundfos	
B94809	TB-2		12-Jan	X			
B94816	EW-1B	164	13-Jan	13:00	4"	Grundfos	
B94817	EW-2B	142	13-Jan	15:15	4"	Grundfos	
B94814	FSMW-6A	70	13-Jan	9:45		Grundfos	
B94815	FSMW-6B	149	13-Jan	11:00		Grundfos	
B94818	N-10474	60	13-Jan	16:45		Grundfos	
B94819	TB-3		13-Jan	X			
B94820	N-11851	62.5	14-Jan	9:30		Whale	
B94821	N-9938	70.56	14-Jan	12:30		Grundfos	
B94823	FLMW-205B	110	17-Jan			Grundfos	
B94827	N-10470	64.9	17-Jan	14:30		Whale	
B94829	N-11860	60.15	17-Jan	16:20		Whale	
B94822	TB-4		17-Jan	X		not submitted	
B94826	N-10324	57	18-Jan	15:45		bailer	
B94828	N-10325	55.3	18-Jan	11:50		bailer	
B94825	N-10328	53.8	18-Jan	9:45		bailer	
B94824	N-11855	60.25	18-Jan	14:15		Whale	
iced in	N-10326	57.2					
iced in	N-10327	54.95					
iced in	N-10472	62					
backup	N-11850	65					
loose	N-11852	100					
	Total number of wells sampled = 24						

APPENDIX E

ANALYTICAL LABORATORY DATA SUMMARY SHEETS

H2M LABS, INC.

SDG NARRATIVE FOR VOLATILES
SAMPLES RECEIVED: 4/13 & 15/99
CONTRACT: C003786
CASE: RA-098
SDG #: 0127

For Samples:

ANSON MW-8	N-10464	N-11850	TRIP BLANK
N-9938	N-10465	N-11854	FLMW-204B
N-9939	N-10470	N-11855	N-10328MS/MSD
N-10322	N-10477	N-11862	
N-10325	N-10478	NYT MW-3	
N-10326	N-10479	UN-16	

The above samples were analyzed according to the requirements of the NYS DECASP 10/95 method 95-1 for the TCL volatile organic analytes.

Sample N-10328 was analyzed as the matrix spike/matrix spike duplicate sample. All percent recoveries in the MS/MSD were within the QC limits. Several RPD's were slightly high. All percent recoveries were within QC limits for the matrix spike blank.

Samples N-10470 and N-10328 were reanalyzed at a dilution due to concentration levels of targeted analytes above the calibration range. Both sets of data are submitted.

All quality control and calibration requirements were met

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

Date Reported: May 5, 1999

Joann M. Slavin
Quality Assurance Manager

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H2M LABS, INC.

SDG NARRATIVE FOR VOLATILES
CONTRACT: C003786
CASE NO.: RA098
SDG NO.: 0127A
SAMPLES RECEIVED: 4/15 & 4/16/99

For Samples:

FLMW-205B	N-10471 MS/MSD	N-11851
N-72301	N-10472	N-11852
N-92301	N-10474	N-11858
N-10324	N-10475	TRIP BLANK 4/14
N-10327	N-10476	TRIP BLANK 4/15
N-10329	N-11848	EW-1B
N-10459	N-11849	EW-2B

The above samples were analyzed according to the requirements of the NYSDEC ASP 10/95 method 95-1 for the TCL volatile organic analytes.

Sample N-10471 was analyzed as the matrix spike/matrix spike duplicate sample. All percent recoveries and RPD's were met.

Due to concentration levels above the calibration range, samples EW-1B and EW-2B were reanalyzed at a dilution. Both sets of data are submitted.

All quality control and calibration requirements were met.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

Date Reported: May 11, 1999

Joann M. Slavin
Quality Assurance Manager

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ANSON MW-8

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127

Matrix: (soil/water) WATER Lab Sample ID: 9910142

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22795.D

Level: (low/med) LOW Date Received: 04/13/99

% Moisture: not dec. Date Analyzed: 04/19/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

S 0020

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EW-1B

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127A

Matrix: (soil/water) WATER Lab Sample ID: 9910428

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22861.D

Level: (low/med) LOW Date Received: 04/16/99

% Moisture: not dec. ______ Date Analyzed: 04/22/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	27	
75-34-4	1,1-Dichloroethane	5	J
540-59-0	1,2-Dichloroethene (total)	63	
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	51	
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	75	
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	610	E
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	3	J
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	2	J
1330-20-7	Xylene (total)	5	J

Use EW-1B DL

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EW-1BDL

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127A

Matrix: (soil/water) WATER Lab Sample ID: 9910428DL

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22874.D

Level: (low/med) LOW Date Received: 04/16/99

% Moisture: not dec. Date Analyzed: 04/22/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 50.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	500	U
74-83-9	Bromomethane	500	U
75-01-4	Vinyl Chloride	500	U
75-00-3	Chloroethane	500	U
75-09-2	Methylene Chloride	500	U
67-64-1	Acetone	500	U
75-15-0	Carbon Disulfide	500	U
75-35-4	1,1-Dichloroethene	500	U
75-34-4	1,1-Dichloroethane	500	U
540-59-0	1,2-Dichloroethene (total)	59	JD
78-93-3	2-Butanone	500	U
67-66-3	Chloroform	500	U
107-06-2	1,2-Dichloroethane	500	U
71-55-6	1,1,1-Trichloroethane	500	U
56-23-5	Carbon Tetrachloride	500	U
75-27-4	Bromodichloromethane	500	U
78-87-5	1,2-Dichloropropane	500	U
10061-01-5	cis-1,3-Dichloropropene	500	U
79-01-6	Trichloroethene	71	JD
71-43-2	Benzene	500	U
124-48-1	Dibromochloromethane	500	U
10061-02-6	trans-1,3-Dichloropropene	500	U
79-00-5	1,1,2-Trichloroethane	500	U
75-25-2	Bromoform	500	U
108-10-1	4-Methyl-2-Pentanone	500	U
591-78-6	2-Hexanone	500	U
127-18-4	Tetrachloroethene	620	D
79-34-5	1,1,2,2-Tetrachloroethane	500	U
108-88-3	Toluene	500	U
108-90-7	Chlorobenzene	500	U
100-41-4	Ethylbenzene	500	U
100-42-5	Styrene	500	U
1330-20-7	Xylene (total)	500	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
EW-1C

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127C

Matrix: (soil/water) WATER Lab Sample ID: 9910968

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22863.D

Level: (low/med) LOW Date Received: 04/21/99

% Moisture: not dec. Date Analyzed: 04/22/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	9	J
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

S 0021

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EW-2B

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127A

Matrix: (soil/water) WATER Lab Sample ID: 9910429

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22862.D

Level: (low/med) LOW Date Received: 04/16/99

% Moisture: not dec. Date Analyzed: 04/22/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	130	
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	9	J
75-34-4	1,1-Dichloroethane	3	J
540-59-0	1,2-Dichloroethene (total)	65	
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	2	J
71-55-6	1,1,1-Trichloroethane	6	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	230	E
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	31	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	6	J
108-90-7	Chlorobenzene	3	J
100-41-4	Ethylbenzene	1	J
100-42-5	Styrene	2	J
1330-20-7	Xylene (total)	6	J

use EW-2B DL

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EW-2BDL

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127A

Matrix: (soil/water) WATER Lab Sample ID: 9910429DL

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22875.D

Level: (low/med) LOW Date Received: 04/16/99

% Moisture: not dec. Date Analyzed: 04/22/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 2.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	20	U
74-83-9	Bromomethane	20	U
75-01-4	Vinyl Chloride	110	D
75-00-3	Chloroethane	20	U
75-09-2	Methylene Chloride	20	U
67-64-1	Acetone	20	U
75-15-0	Carbon Disulfide	20	U
75-35-4	1,1-Dichloroethene*	8	JD
75-34-4	1,1-Dichloroethane	3	JD
540-59-0	1,2-Dichloroethene (total)	62	D
78-93-3	2-Butanone	20	U
67-66-3	Chloroform	20	U
107-06-2	1,2-Dichloroethane	20	U
71-55-6	1,1,1-Trichloroethane	6	JD
56-23-5	Carbon Tetrachloride	20	U
75-27-4	Bromodichloromethane	20	U
78-87-5	1,2-Dichloropropane	20	U
10061-01-5	cis-1,3-Dichloropropene	20	U
79-01-6	Trichloroethene	220	D
71-43-2	Benzene	20	U
124-48-1	Dibromochloromethane	20	U
10061-02-6	trans-1,3-Dichloropropene	20	U
79-00-5	1,1,2-Trichloroethane	20	U
75-25-2	Bromoform	20	U
108-10-1	4-Methyl-2-Pentanone	20	U
591-78-6	2-Hexanone	20	U
127-18-4	Tetrachloroethene	27	D
79-34-5	1,1,2,2-Tetrachloroethane	20	U
108-88-3	Toluene	6	JD
108-90-7	Chlorobenzene	3	JD
100-41-4	Ethylbenzene	20	U
100-42-5	Styrene	2	JD
1330-20-7	Xylene (total)	5	JD

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EW-02C

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127C

Matrix: (soil/water) WATER Lab Sample ID: 9910969

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22864.D

Level: (low/med) LOW Date Received: 04/21/99

% Moisture: not dec. Date Analyzed: 04/22/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

S 0023

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FLM204B

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127

Matrix: (soil/water) WATER Lab Sample ID: 9910364

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22826.D

Level: (low/med) LOW Date Received: 04/15/99

% Moisture: not dec. Date Analyzed: 04/21/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	5	JB
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	1	J
75-34-3	1,1-Dichloroethane	1	J
540-59-0	1,2-Dichloroethene (total)	7	J
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	6	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	46	
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	52	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

S 0022

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FLMW-205B

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127A

Matrix: (soil/water) WATER Lab Sample ID: 9910367

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22852.D

Level: (low/med) LOW Date Received: 04/15/99

% Moisture: not dec. Date Analyzed: 04/22/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	17	
75-34-4	1,1-Dichloroethane	11	
540-59-0	1,2-Dichloroethene (total)	16	
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	2	J
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	64	
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	67	
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	110	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-10321

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127C

Matrix: (soil/water) WATER Lab Sample ID: 9910970

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22865.D

Level: (low/med) LOW Date Received: 04/21/99

% Moisture: not dec. Date Analyzed: 04/22/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	6	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	7	J
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

S 0025

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-10322

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127

Matrix: (soil/water) WATER Lab Sample ID: 9910145

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22799.D

Level: (low/med) LOW Date Received: 04/13/99

% Moisture: not dec. Date Analyzed: 04/19/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	5	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	12	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

S 0023

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-10324

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127A

Matrix: (soil/water) WATER Lab Sample ID: 9910370

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22833.D

Level: (low/med) LOW Date Received: 04/15/99

% Moisture: not dec. Date Analyzed: 04/21/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	3	JB
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	2	J
75-34-4	1,1-Dichloroethane	5	J
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	47	
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	13	
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	18	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	2	J
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	3	J

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-10325

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127

Matrix: (soil/water) WATER Lab Sample ID: 9910146

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22800.D

Level: (low/med) LOW Date Received: 04/13/99

% Moisture: not dec. ______ Date Analyzed: 04/19/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	2	J
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	42	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

S 0030

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-10326

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127

Matrix: (soil/water) WATER Lab Sample ID: 9910147

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22801.D

Level: (low/med) LOW Date Received: 04/13/99

% Moisture: not dec. ______ Date Analyzed: 04/19/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	7	J
75-34-3	1,1-Dichloroethane	3	J
540-59-0	1,2-Dichloroethene (total)	110	
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	2	J
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	42	
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	11	
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	89	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

S 0032

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-10327

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127A

Matrix: (soil/water) WATER Lab Sample ID: 9910371

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22825.D

Level: (low/med) LOW Date Received: 04/15/99

% Moisture: not dec. Date Analyzed: 04/21/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	5	JB
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	3	J
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-10328

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127

Matrix: (soil/water) WATER Lab Sample ID: 9910365

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22827.D

Level: (low/med) LOW Date Received: 04/15/99

% Moisture: not dec. Date Analyzed: 04/21/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	3	JB
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	63	
75-34-3	1,1-Dichloroethane	36	
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	670	E
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	4	J
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

S 0034

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-10328DL

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127

Matrix: (soil/water) WATER Lab Sample ID: 9910365DL

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22851.D

Level: (low/med) LOW Date Received: 04/15/99

% Moisture: not dec. Date Analyzed: 04/22/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 5.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	50	U
74-83-9	Bromomethane	50	U
75-01-4	Vinyl Chloride	50	U
75-00-3	Chloroethane	50	U
75-09-2	Methylene Chloride	50	U
67-64-1	Acetone	50	U
75-15-0	Carbon Disulfide	50	U
75-35-4	1,1-Dichloroethene	54	D
75-34-3	1,1-Dichloroethane	31	JD
540-59-0	1,2-Dichloroethene (total)	50	U
78-93-3	2-Butanone	50	U
67-66-3	Chloroform	50	U
107-06-2	1,2-Dichloroethane	50	U
71-55-6	1,1,1-Trichloroethane	540	D
56-23-5	Carbon Tetrachloride	50	U
75-27-4	Bromodichloromethane	50	U
78-87-5	1,2-Dichloropropane	50	U
10061-01-5	cis-1,3-Dichloropropene	50	U
79-01-6	Trichloroethene	50	U
71-43-2	Benzene	50	U
124-48-1	Dibromochloromethane	50	U
10061-02-6	trans-1,3-Dichloropropene	50	U
79-00-5	1,1,2-Trichloroethane	50	U
75-25-2	Bromoform	50	U
108-10-1	4-Methyl-2-Pentanone	50	U
591-78-6	2-Hexanone	50	U
127-18-4	Tetrachloroethene	50	U
79-34-5	1,1,2,2-Tetrachloroethane	50	U
108-88-3	Toluene	50	U
108-90-7	Chlorobenzene	50	U
100-41-4	Ethylbenzene	50	U
100-42-5	Styrene	50	U
1330-20-7	Xylene (total)	50	U

S 0036

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-10329

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127A

Matrix: (soil/water) WATER Lab Sample ID: 9910372

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22834.D

Level: (low/med) LOW Date Received: 04/15/99

% Moisture: not dec. Date Analyzed: 04/21/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-10459

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127A

Matrix: (soil/water) WATER Lab Sample ID: 9910373

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22835.D

Level: (low/med) LOW Date Received: 04/15/99

% Moisture: not dec. ________ Date Analyzed: 04/21/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ________ (uL) Soil Aliquot Volume: ________ (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	2	JB
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
N-10462

Lab Name: H2M LABS, INC. Contract: C003786
Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127C
Matrix: (soil/water) WATER Lab Sample ID: 9910971
Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22866.D
Level: (low/med) LOW Date Received: 04/21/99
% Moisture: not dec. Date Analyzed: 04/22/99
GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0
Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	14	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

S 0027

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-10464

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127

Matrix: (soil/water) WATER Lab Sample ID: 9910148

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22802.D

Level: (low/med) LOW Date Received: 04/13/99

% Moisture: not dec. Date Analyzed: 04/19/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

S 0038

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-10465

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127

Matrix: (soil/water) WATER Lab Sample ID: 9910149

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22803.D

Level: (low/med) LOW Date Received: 04/13/99

% Moisture: not dec. Date Analyzed: 04/19/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	2	J
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

S 0040

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-10470

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127

Matrix: (soil/water) WATER Lab Sample ID: 9910150

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22804.D

Level: (low/med) LOW Date Received: 04/13/99

% Moisture: not dec. ______ Date Analyzed: 04/19/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q	
74-87-3	Chloromethane	10	U	
74-83-9	Bromomethane	10	U	
75-01-4	Vinyl Chloride	2	J	
75-00-3	Chloroethane	19		
75-09-2	Methylene Chloride	1	J	
67-64-1	Acetone	10	U	
75-15-0	Carbon Disulfide	10	U	
75-35-4	1,1-Dichloroethene	500	E	use N 10470 D
75-34-3	1,1-Dichloroethane	520	E	use N 10470 D
540-59-0	1,2-Dichloroethene (total)	18		
78-93-3	2-Butanone	10	U	
67-66-3	Chloroform	10	U	
107-06-2	1,2-Dichloroethane	3	J	
71-55-6	1,1,1-Trichloroethane	4100	E	— use N 10470 D
56-23-5	Carbon Tetrachloride	10	U	
75-27-4	Bromodichloromethane	10	U	
78-87-5	1,2-Dichloropropane	10	U	
10061-01-5	cis-1,3-Dichloropropene	10	U	
79-01-6	Trichloroethene	8	J	
71-43-2	Benzene	10	U	
124-48-1	Dibromochloromethane	10	U	
10061-02-6	trans-1,3-Dichloropropene	10	U	
79-00-5	1,1,2-Trichloroethane	10	U	
75-25-2	Bromoform	10	U	
108-10-1	4-Methyl-2-Pentanone	10	U	
591-78-6	2-Hexanone	10	U	
127-18-4	Tetrachloroethene	51		
79-34-5	1,1,2,2-Tetrachloroethane	10	U	
108-88-3	Toluene	10	U	
108-90-7	Chlorobenzene	10	U	
100-41-4	Ethylbenzene	10	U	
100-42-5	Styrene	10	U	
1330-20-7	Xylene (total)	10	U	

S 0042

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-10470DL

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127

Matrix: (soil/water) WATER Lab Sample ID: 9910150DL

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22822.D

Level: (low/med) LOW Date Received: 04/13/99

% Moisture: not dec. ______ Date Analyzed: 04/21/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 100.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/L Q

74-87-3	Chloromethane	1000	U
74-83-9	Bromomethane	1000	U
75-01-4	Vinyl Chloride	1000	U
75-00-3	Chloroethane	1000	U
75-09-2	Methylene Chloride	1000	U
67-64-1	Acetone	330	JBD
75-15-0	Carbon Disulfide	1000	U
75-35-4	1,1-Dichloroethene	420	JD
75-34-3	1,1-Dichloroethane	460	JD
540-59-0	1,2-Dichloroethene (total)	1000	U
78-93-3	2-Butanone	1000	U
67-66-3	Chloroform	1000	U
107-06-2	1,2-Dichloroethane	1000	U
71-55-6	1,1,1-Trichloroethane	9600	D
56-23-5	Carbon Tetrachloride	1000	U
75-27-4	Bromodichloromethane	1000	U
78-87-5	1,2-Dichloropropane	1000	U
10061-01-5	cis-1,3-Dichloropropene	1000	U
79-01-6	Trichloroethene	1000	U
71-43-2	Benzene	1000	U
124-48-1	Dibromochloromethane	1000	U
10061-02-6	trans-1,3-Dichloropropene	1000	U
79-00-5	1,1,2-Trichloroethane	1000	U
75-25-2	Bromoform	1000	U
108-10-1	4-Methyl-2-Pentanone	1000	U
591-78-6	2-Hexanone	1000	U
127-18-4	Tetrachloroethene	1000	U
79-34-5	1,1,2,2-Tetrachloroethane	1000	U
108-88-3	Toluene	1000	U
108-90-7	Chlorobenzene	1000	U
100-41-4	Ethylbenzene	1000	U
100-42-5	Styrene	1000	U
1330-20-7	Xylene (total)	1000	U

S 0044

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-10471

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127A

Matrix: (soil/water) WATER Lab Sample ID: 9910374

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22836.D

Level: (low/med) LOW Date Received: 04/15/99

% Moisture: not dec. Date Analyzed: 04/21/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	3	JB
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	1	J
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	1	J
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-10472

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127A

Matrix: (soil/water) WATER Lab Sample ID: 9910375

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22839.D

Level: (low/med) LOW Date Received: 04/15/99

% Moisture: not dec. Date Analyzed: 04/21/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	4	JB
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	1	J
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-10474

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127A

Matrix: (soil/water) WATER Lab Sample ID: 9910376

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22840.D

Level: (low/med) LOW Date Received: 04/15/99

% Moisture: not dec. Date Analyzed: 04/21/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	2	J
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	9	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	2	J
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	2	J
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	7	J
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	1	J
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	8	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-10475

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127A

Matrix: (soil/water) WATER Lab Sample ID: 9910377

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22841.D

Level: (low/med) LOW Date Received: 04/15/99

% Moisture: not dec. Date Analyzed: 04/21/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	6	JB
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	1	J
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-10476

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127A

Matrix: (soil/water) WATER Lab Sample ID: 9910378

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22842.D

Level: (low/med) LOW Date Received: 04/15/99

% Moisture: not dec. Date Analyzed: 04/21/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	2	JB
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	1	J
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-10477

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127

Matrix: (soil/water) WATER Lab Sample ID: 9910151

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22805.D

Level: (low/med) LOW Date Received: 04/13/99

% Moisture: not dec. Date Analyzed: 04/19/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	2	J
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	2	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	1	J
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

S 0046

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-10478

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127

Matrix: (soil/water) WATER Lab Sample ID: 9910152

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22806.D

Level: (low/med) LOW Date Received: 04/13/99

% Moisture: not dec. Date Analyzed: 04/19/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	1	J
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

S 0043

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-10479

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127

Matrix: (soil/water) WATER Lab Sample ID: 9910153

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22807.D

Level: (low/med) LOW Date Received: 04/13/99

% Moisture: not dec. Date Analyzed: 04/19/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

S 0050

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-11848

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127A

Matrix: (soil/water) WATER Lab Sample ID: 9910379

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22843.D

Level: (low/med) LOW Date Received: 04/15/99

% Moisture: not dec. Date Analyzed: 04/21/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	2	JB
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-11849

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127A

Matrix: (soil/water) WATER Lab Sample ID: 9910380

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22844.D

Level: (low/med) LOW Date Received: 04/15/99

% Moisture: not dec. ______ Date Analyzed: 04/21/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	2	JB
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-10850

N-11850

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127

Matrix: (soil/water) WATER Lab Sample ID: 9910154

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22808.D

Level: (low/med) LOW Date Received: 04/13/99

% Moisture: not dec. Date Analyzed: 04/19/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	1	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	12	
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	35	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

S 0052

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-11851

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127A

Matrix: (soil/water) WATER Lab Sample ID: 9910381

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22856.D

Level: (low/med) LOW Date Received: 04/15/99

% Moisture: not dec. Date Analyzed: 04/22/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	2	J
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-11852

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127A

Matrix: (soil/water) WATER Lab Sample ID: 9910382

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22857.D

Level: (low/med) LOW Date Received: 04/15/99

% Moisture: not dec. ______ Date Analyzed: 04/22/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	2	J
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	7	J
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	2	J
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-10854

N-11854

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127

Matrix: (soil/water) WATER Lab Sample ID: 9910155

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22809.D

Level: (low/med) LOW Date Received: 04/13/99

% Moisture: not dec. Date Analyzed: 04/19/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	2	J
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

S 0054

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-10855

N-11855

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127

Matrix: (soil/water) WATER Lab Sample ID: 9910156

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22810.D

Level: (low/med) LOW Date Received: 04/13/99

% Moisture: not dec. Date Analyzed: 04/19/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	13	
75-34-3	1,1-Dichloroethane	4	J
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	190	
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

S 0056

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-11858

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127A

Matrix: (soil/water) WATER Lab Sample ID: 9910383

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22858.D

Level: (low/med) LOW Date Received: 04/15/99

% Moisture: not dec. Date Analyzed: 04/22/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
N-11859

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127C

Matrix: (soil/water) WATER Lab Sample ID: 9910972

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22867.D

Level: (low/med) LOW Date Received: 04/21/99

% Moisture: not dec. Date Analyzed: 04/22/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

S 0029

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-11860

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127C

Matrix: (soil/water) WATER Lab Sample ID: 9910431

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22823.D

Level: (low/med) LOW Date Received: 04/16/99

% Moisture: not dec. Date Analyzed: 04/21/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	5	JB
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	5	J
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	2	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

S 0031

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
N-11861

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127C

Matrix: (soil/water) WATER Lab Sample ID: 9910432

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22824.D

Level: (low/med) LOW Date Received: 04/16/99

% Moisture: not dec. Date Analyzed: 04/21/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

S 0033

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-10862

N-11862

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127

Matrix: (soil/water) WATER Lab Sample ID: 9910157

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22811.D

Level: (low/med) LOW Date Received: 04/13/99

% Moisture: not dec. ______ Date Analyzed: 04/19/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

S 0053

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-9938

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127

Matrix: (soil/water) WATER Lab Sample ID: 9910143

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22798.D

Level: (low/med) LOW Date Received: 04/13/99

% Moisture: not dec. ________ Date Analyzed: 04/19/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ________ (uL) Soil Aliquot Volume: ________ (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	21	
75-34-3	1,1-Dichloroethane	27	
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	170	
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	12	
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	8	J
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

S 0024

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-9939

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127

Matrix: (soil/water) WATER Lab Sample ID: 9910144

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22797.D

Level: (low/med) LOW Date Received: 04/13/99

% Moisture: not dec. Date Analyzed: 04/19/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	2	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	1	J
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

S 0026

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
NEHOPPER&MAI

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127C

Matrix: (soil/water) WATER Lab Sample ID: 9910433

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22791.D

Level: (low/med) LOW Date Received: 04/16/99

% Moisture: not dec. Date Analyzed: 04/19/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	130	
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	4	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	69	
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	4	J
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
NRMW-1

Lab Name: H2M LABS, INC. Contract: C003786
Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127C
Matrix: (soil/water) WATER Lab Sample ID: 9910973
Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22868.D
Level: (low/med) LOW Date Received: 04/21/99
% Moisture: not dec. Date Analyzed: 04/22/99
GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0
Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	3	J
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NRMW-2

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127C

Matrix: (soil/water) WATER Lab Sample ID: 9910974

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22869.D

Level: (low/med) LOW Date Received: 04/21/99

% Moisture: not dec. Date Analyzed: 04/22/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	2	J
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	1	J
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

S 0037

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
NRMW-03

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127C

Matrix: (soil/water) WATER Lab Sample ID: 9910975

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22870.D

Level: (low/med) LOW Date Received: 04/21/99

% Moisture: not dec. Date Analyzed: 04/22/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	1	J
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

S 0039

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-72301

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127A

Matrix: (soil/water) WATER Lab Sample ID: 9910368

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22831.D

Level: (low/med) LOW Date Received: 04/15/99

% Moisture: not dec. ____ Date Analyzed: 04/21/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ____ (uL) Soil Aliquot Volume: ____ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	3	J
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N-92301

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127A

Matrix: (soil/water) WATER Lab Sample ID: 9910369

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22832.D

Level: (low/med) LOW Date Received: 04/15/99

% Moisture: not dec. ______ Date Analyzed: 04/21/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	3	JB
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NYT MW-3

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127

Matrix: (soil/water) WATER Lab Sample ID: 9910158

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22812.D

Level: (low/med) LOW Date Received: 04/13/99

% Moisture: not dec. Date Analyzed: 04/19/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

S 0060

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

UN-16

Lab Name: H2M LABS, INC. Contract: C003786

Lab Code: 10478 Case No.: RA098 SAS No.: NDEC SDG No.: 0127

Matrix: (soil/water) WATER Lab Sample ID: 9910159

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A22813.D

Level: (low/med) LOW Date Received: 04/13/99

% Moisture: not dec. Date Analyzed: 04/19/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	2	J
540-59-0	1,2-Dichloroethene (total)	32	
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	1	J
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	2	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	34	
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	66	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

S 0062

H2M LABS, INC.

SDG NARRATIVE FOR VOLATILES
CONTRACT: C003786
CASE: RA099
SDG: 0809
SAMPLES RECEIVED: 8/10 – 8/24/99

For Samples:

EW-1B	N-10323/B94817	B94832	B94847 (N-11849)
EW-1C	N-10324/B94818	B94833	B94848 (N-10471D)
EW-2B	N-10472/B94819	B94834	B94849 (N-10471S)
EW-2C	TB-2	B94835	B94850 (N-10327)
NRMW-1	B94820	B94836	B94851 (N-FLMW-205B)
NRMW-2	B94821	B94837	B94852 (N-10325)
NRMW-3	B94822 MS/MSD	B94838	B94853 (N-11855)
N-11861	B94825	B94839 (TB-5)	B94854 (TB-6)
N-9937	B94826	B94840 (N-11852)	B94855 (N-11860)
N-9938 MS/MSD	B94827	B94841 (N-11851)	B94856 (N-11858)
N-9939	B94828	B94842 (N-10470)	B94857 (N-10464)
TB-1	B94829	B94843 (N-10328)	B94858 (N-10465)
N-10459/B94814	B94830	B94844 (N-10326)	B94859 (N-10322)
N-10329/B94815	B94831	B94845 (ANSON MW-8)	B94860 (UN-23)
N-10462/B94816		B94846 (N-10476)	

The above samples were analyzed according to the requirements of the NYS DEC ASP 10/95 method 95-1 for the TCL volatile organic analytes.

Samples B94822 and N-9938 were analyzed as the matrix spike/matrix spike duplicate samples. All percent recovery and RPD criteria were met except for the RPD of 1,1-dichloroethene in sample N-9938 at 15% (limit 14%).

Due to concentration levels of targeted analytes above the calibration range the following samples required reanalysis at a dilution: B94842, B94843, B94844, B94853, EW1B, N9937 and N9938. Both sets of data are submitted.

All quality control and calibration requirements were met.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

Date Reported: September 27, 1998

J.M. Slavin

Joann M. Slavin
Quality Assurance Manager

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94825

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924246

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A24324.D

Level: (low/med) LOW Date Received: 08/17/99

% Moisture: not dec. Date Analyzed: 08/18/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	7	J
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	3	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	42	
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	43	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94826

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: ______ SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924247

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A24325.D

Level: (low/med) LOW Date Received: 08/17/99

% Moisture: not dec. ______ Date Analyzed: 08/18/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	1	J
540-59-0	1,2-Dichloroethene (total)	32	
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	1	J
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	2	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	36	
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	96	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94827

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: ______ SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924248

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A24326.D

Level: (low/med) LOW Date Received: 08/17/99

% Moisture: not dec. ______ Date Analyzed: 08/18/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94828

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924249

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A24327.D

Level: (low/med) LOW Date Received: 08/17/99

% Moisture: not dec. Date Analyzed: 08/18/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94829

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: ____ SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924250

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A24328.D

Level: (low/med) LOW Date Received: 08/17/99

% Moisture: not dec. ____ Date Analyzed: 08/18/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ____ (uL) Soil Aliquot Volume: ____ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94830

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: ______ SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924251

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A24329.D

Level: (low/med) LOW Date Received: 08/17/99

% Moisture: not dec. ______ Date Analyzed: 08/18/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	6	J
75-34-3	1,1-Dichloroethane	8	J
540-59-0	1,2-Dichloroethene (total)	3	J
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	43	
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	6	J
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	47	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94831

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: ______ SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924252

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A24330.D

Level: (low/med) LOW Date Received: 08/17/99

% Moisture: not dec. ______ Date Analyzed: 08/18/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	9	J
75-34-3	1,1-Dichloroethane	1	J
540-59-0	1,2-Dichloroethene (total)	20	
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	1	J
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	23	
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	18	
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	41	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94832

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924429

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: F1390.D

Level: (low/med) LOW Date Received: 08/18/99

% Moisture: not dec. Date Analyzed: 08/23/99

GC Column: RTX624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94833

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924430

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: F1391.D

Level: (low/med) LOW Date Received: 08/18/99

% Moisture: not dec. Date Analyzed: 08/23/99

GC Column: RTX624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	1	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94834

Lab Name: H2M LABS,INC   Contract: C003786

Lab Code: 10478   Case No.: RA099   SAS No.: ______   SDG No.: 0809

Matrix: (soil/water) WATER   Lab Sample ID: 9924431

Sample wt/vol: 5.0 (g/ml) ML   Lab File ID: F1392.D

Level: (low/med) LOW   Date Received: 08/18/99

% Moisture: not dec. ______   Date Analyzed: 08/23/99

GC Column: RTX624 ID: 0.25 (mm)   Dilution Factor: 1.0

Soil Extract Volume: ______ (uL)   Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	14	
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94835

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924432

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: F1393.D

Level: (low/med) LOW Date Received: 08/18/99

% Moisture: not dec. Date Analyzed: 08/23/99

GC Column: RTX624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/L Q

74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	2	J
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94836

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924433

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: F1394.D

Level: (low/med) LOW Date Received: 08/18/99

% Moisture: not dec. Date Analyzed: 08/23/99

GC Column: RTX624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	8	J
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	20	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94837

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924434

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: F1395.D

Level: (low/med) LOW Date Received: 08/18/99

% Moisture: not dec. Date Analyzed: 08/23/99

GC Column: RTX624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	100	
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	4	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	73	
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	J
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94838

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924435

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: F1396.D

Level: (low/med) LOW Date Received: 08/18/99

% Moisture: not dec. Date Analyzed: 08/23/99

GC Column: RTX624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	2	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	3	J
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94839

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924671

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: F1397.D

Level: (low/med) LOW Date Received: 08/20/99

% Moisture: not dec. Date Analyzed: 08/23/99

GC Column: RTX624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94840

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: ______ SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924672

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: F1398.D

Level: (low/med) LOW Date Received: 08/20/99

% Moisture: not dec. ______ Date Analyzed: 08/23/99

GC Column: RTX624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	4	J
540-59-0	1,2-Dichloroethene (total)	17	
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	2	J
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	3	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	8	J
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	4	J
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94841

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924673

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: F1399.D

Level: (low/med) LOW Date Received: 08/20/99

% Moisture: not dec. Date Analyzed: 08/23/99

GC Column: RTX624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	3	J
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94842

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924674

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: F1400.D

Level: (low/med) LOW Date Received: 08/20/99

% Moisture: not dec. Date Analyzed: 08/23/99

GC Column: RTX624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	68	
75-09-2	Methylene Chloride	3	J
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	1400	E
75-34-3	1,1-Dichloroethane	1300	E
540-59-0	1,2-Dichloroethene (total)	13	
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	2	J
107-06-2	1,2-Dichloroethane	8	J
71-55-6	1,1,1-Trichloroethane	6000	E
56-23-5	Carbon Tetrachloride	910	E
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	7	J
71-43-2	Benzene	2	J
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	27	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94842DL

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924674DL

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: F1445.D

Level: (low/med) LOW Date Received: 08/20/99

% Moisture: not dec. Date Analyzed: 08/26/99

GC Column: RTX624 ID: 0.25 (mm) Dilution Factor: 500.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	5000	U
74-83-9	Bromomethane	5000	U
75-01-4	Vinyl Chloride	5000	U
75-00-3	Chloroethane	5000	U
75-09-2	Methylene Chloride	5000	U
67-64-1	Acetone	5000	U
75-15-0	Carbon Disulfide	5000	U
75-35-4	1,1-Dichloroethene	1400	JD
75-34-3	1,1-Dichloroethane	1700	JD
540-59-0	1,2-Dichloroethene (total)	5000	U
78-93-3	2-Butanone	5000	U
67-66-3	Chloroform	5000	U
107-06-2	1,2-Dichloroethane	5000	U
71-55-6	1,1,1-Trichloroethane	26000	D
56-23-5	Carbon Tetrachloride	5000	U
75-27-4	Bromodichloromethane	5000	U
78-87-5	1,2-Dichloropropane	5000	U
10061-01-5	cis-1,3-Dichloropropene	5000	U
79-01-6	Trichloroethene	5000	U
71-43-2	Benzene	5000	U
124-48-1	Dibromochloromethane	5000	U
10061-02-6	trans-1,3-Dichloropropene	5000	U
79-00-5	1,1,2-Trichloroethane	5000	U
75-25-2	Bromoform	5000	U
108-10-1	4-Methyl-2-Pentanone	5000	U
591-78-6	2-Hexanone	5000	U
127-18-4	Tetrachloroethene	5000	U
79-34-5	1,1,2,2-Tetrachloroethane	5000	U
108-88-3	Toluene	5000	U
108-90-7	Chlorobenzene	5000	U
100-41-4	Ethylbenzene	5000	U
100-42-5	Styrene	5000	U
1330-20-7	Xylene (total)	5000	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94843

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924675

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: F1401.D

Level: (low/med) LOW Date Received: 08/20/99

% Moisture: not dec. Date Analyzed: 08/23/99

GC Column: RTX624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	58	
75-34-3	1,1-Dichloroethane	28	
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	J
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	630	E
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	2	J
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	2	J
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94843DL

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924675DL

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: F1446.D

Level: (low/med) LOW Date Received: 08/20/99

% Moisture: not dec. Date Analyzed: 08/26/99

GC Column: RTX624 ID: 0.25 (mm) Dilution Factor: 5.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	50	U
74-83-9	Bromomethane	50	U
75-01-4	Vinyl Chloride	50	U
75-00-3	Chloroethane	50	U
75-09-2	Methylene Chloride	50	U
67-64-1	Acetone	50	U
75-15-0	Carbon Disulfide	50	U
75-35-4	1,1-Dichloroethene	32	JD
75-34-3	1,1-Dichloroethane	19	JD
540-59-0	1,2-Dichloroethene (total)	50	U
78-93-3	2-Butanone	50	U
67-66-3	Chloroform	50	U
107-06-2	1,2-Dichloroethane	50	U
71-55-6	1,1,1-Trichloroethane	320	D
56-23-5	Carbon Tetrachloride	50	U
75-27-4	Bromodichloromethane	50	U
78-87-5	1,2-Dichloropropane	50	U
10061-01-5	cis-1,3-Dichloropropene	50	U
79-01-6	Trichloroethene	50	U
71-43-2	Benzene	50	U
124-48-1	Dibromochloromethane	50	U
10061-02-6	trans-1,3-Dichloropropene	50	U
79-00-5	1,1,2-Trichloroethane	50	U
75-25-2	Bromoform	50	U
108-10-1	4-Methyl-2-Pentanone	50	U
591-78-6	2-Hexanone	50	U
127-18-4	Tetrachloroethene	50	U
79-34-5	1,1,2,2-Tetrachloroethane	50	U
108-88-3	Toluene	50	U
108-90-7	Chlorobenzene	50	U
100-41-4	Ethylbenzene	50	U
100-42-5	Styrene	50	U
1330-20-7	Xylene (total)	50	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94844

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924676

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: F1402.D

Level: (low/med) LOW Date Received: 08/20/99

% Moisture: not dec. Date Analyzed: 08/23/99

GC Column: RTX624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	9	J
75-34-3	1,1-Dichloroethane	3	J
540-59-0	1,2-Dichloroethene (total)	270	
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	2	J
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	50	
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	18	
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	160	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94844DL

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: ______ SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924676DL

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: F1447.D

Level: (low/med) LOW Date Received: 08/20/99

% Moisture: not dec. ______ Date Analyzed: 08/26/99

GC Column: RTX624 ID: 0.25 (mm) Dilution Factor: 2.5

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	25	U
74-83-9	Bromomethane	25	U
75-01-4	Vinyl Chloride	25	U
75-00-3	Chloroethane	25	U
75-09-2	Methylene Chloride	25	U
67-64-1	Acetone	25	U
75-15-0	Carbon Disulfide	25	U
75-35-4	1,1-Dichloroethene	6	JD
75-34-3	1,1-Dichloroethane	3	JD
540-59-0	1,2-Dichloroethene (total)	210	D
78-93-3	2-Butanone	25	U
67-66-3	Chloroform	25	U
107-06-2	1,2-Dichloroethane	25	U
71-55-6	1,1,1-Trichloroethane	32	D
56-23-5	Carbon Tetrachloride	25	U
75-27-4	Bromodichloromethane	25	U
78-87-5	1,2-Dichloropropane	25	U
10061-01-5	cis-1,3-Dichloropropene	25	U
79-01-6	Trichloroethene	14	JD
71-43-2	Benzene	25	U
124-48-1	Dibromochloromethane	25	U
10061-02-6	trans-1,3-Dichloropropene	25	U
79-00-5	1,1,2-Trichloroethane	25	U
75-25-2	Bromoform	25	U
108-10-1	4-Methyl-2-Pentanone	25	U
591-78-6	2-Hexanone	25	U
127-18-4	Tetrachloroethene	120	D
79-34-5	1,1,2,2-Tetrachloroethane	25	U
108-88-3	Toluene	25	U
108-90-7	Chlorobenzene	25	U
100-41-4	Ethylbenzene	25	U
100-42-5	Styrene	25	U
1330-20-7	Xylene (total)	25	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
B94844

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924676

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: F1402.D

Level: (low/med) LOW Date Received: 08/20/99

% Moisture: not dec. Date Analyzed: 08/23/99

GC Column: RTX624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	9	J
75-34-3	1,1-Dichloroethane	3	J
540-59-0	1,2-Dichloroethene (total)	270	E
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	2	J
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	50	
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	18	
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	160	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

9ED 11/2/99

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
B94844

Lab Name: H2M LABS,INC Contract: C003786
Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809
Matrix: (soil/water) WATER Lab Sample ID: 9924676
Sample wt/vol: 5.0 (g/ml) ML Lab File ID: F1402.D
Level: (low/med) LOW Date Received: 08/20/99
% Moisture: not dec. Date Analyzed: 08/23/99
GC Column: RTX624 ID: 0.25 (mm) Dilution Factor: 1.0
Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	9	J
75-34-3	1,1-Dichloroethane	3	J
540-59-0	1,2-Dichloroethene (total)	270	~~E~~
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	2	J
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	50	
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	18	
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	160	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

JF 11/2/99

V 0208

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94845

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924677

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: F1403.D

Level: (low/med) LOW Date Received: 08/20/99

% Moisture: not dec. Date Analyzed: 08/23/99

GC Column: RTX624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	3	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94846

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: ______ SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924678

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: F1404.D

Level: (low/med) LOW Date Received: 08/20/99

% Moisture: not dec. ______ Date Analyzed: 08/23/99

GC Column: RTX624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	1	J
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	2	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94847

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924679

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: F1405.D

Level: (low/med) LOW Date Received: 08/20/99

% Moisture: not dec. Date Analyzed: 08/23/99

GC Column: RTX624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	2	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94848

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: ______ SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924680

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: F1406.D

Level: (low/med) LOW Date Received: 08/20/99

% Moisture: not dec. ______ Date Analyzed: 08/23/99

GC Column: RTX624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	6	J
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	2	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94849

Lab Name: H2M LABS,INC   Contract: C003786

Lab Code: 10478   Case No.: RA099   SAS No.: ____   SDG No.: 0809

Matrix: (soil/water) WATER   Lab Sample ID: 9924681

Sample wt/vol: 5.0 (g/ml) ML   Lab File ID: F1407.D

Level: (low/med) LOW   Date Received: 08/20/99

% Moisture: not dec. ____   Date Analyzed: 08/23/99

GC Column: RTX624 ID: 0.25 (mm)   Dilution Factor: 1.0

Soil Extract Volume: ____ (uL)   Soil Aliquot Volume: ____ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	3	J
75-34-3	1,1-Dichloroethane	8	J
540-59-0	1,2-Dichloroethene (total)	17	
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	23	
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	4	J
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	19	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94850

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: ______ SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924682

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: F1408.D

Level: (low/med) LOW Date Received: 08/20/99

% Moisture: not dec. ______ Date Analyzed: 08/23/99

GC Column: RTX624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	4	J
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	1	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	2	J
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94851

Lab Name: H2M LABS,INC   Contract: C003786

Lab Code: 10478   Case No.: RA099   SAS No.:   SDG No.: 0809

Matrix: (soil/water) WATER   Lab Sample ID: 9924683

Sample wt/vol: 5.0 (g/ml) ML   Lab File ID: F1409.D

Level: (low/med) LOW   Date Received: 08/20/99

% Moisture: not dec.   Date Analyzed: 08/23/99

GC Column: RTX624 ID: 0.25 (mm)   Dilution Factor: 1.0

Soil Extract Volume: (uL)   Soil Aliquot Volume: (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	14	
75-34-3	1,1-Dichloroethane	7	J
540-59-0	1,2-Dichloroethene (total)	46	
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	2	J
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	32	
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	100	
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	130	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94852

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: ______ SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924684

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: F1410.D

Level: (low/med) LOW Date Received: 08/20/99

% Moisture: not dec. ______ Date Analyzed: 08/23/99

GC Column: RTX624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	3	J
78-93-3	2-Butanone	4	J
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	5	J
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	33	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94853

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924685

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: F1411.D

Level: (low/med) LOW Date Received: 08/20/99

% Moisture: not dec. Date Analyzed: 08/23/99

GC Column: RTX624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	20	
75-34-3	1,1-Dichloroethane	5	J
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	6	J
67-66-3	Chloroform	1	J
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	260	E
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	2	J
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	3	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94853DL

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924685DL

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: F1448.D

Level: (low/med) LOW Date Received: 08/20/99

% Moisture: not dec. Date Analyzed: 08/26/99

GC Column: RTX624 ID: 0.25 (mm) Dilution Factor: 10.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	100	U
74-83-9	Bromomethane	100	U
75-01-4	Vinyl Chloride	100	U
75-00-3	Chloroethane	100	U
75-09-2	Methylene Chloride	100	U
67-64-1	Acetone	100	U
75-15-0	Carbon Disulfide	100	U
75-35-4	1,1-Dichloroethene	25	JD
75-34-3	1,1-Dichloroethane	100	U
540-59-0	1,2-Dichloroethene (total)	100	U
78-93-3	2-Butanone	100	U
67-66-3	Chloroform	100	U
107-06-2	1,2-Dichloroethane	100	U
71-55-6	1,1,1-Trichloroethane	320	D
56-23-5	Carbon Tetrachloride	100	U
75-27-4	Bromodichloromethane	100	U
78-87-5	1,2-Dichloropropane	100	U
10061-01-5	cis-1,3-Dichloropropene	100	U
79-01-6	Trichloroethene	100	U
71-43-2	Benzene	100	U
124-48-1	Dibromochloromethane	100	U
10061-02-6	trans-1,3-Dichloropropene	100	U
79-00-5	1,1,2-Trichloroethane	100	U
75-25-2	Bromoform	100	U
108-10-1	4-Methyl-2-Pentanone	100	U
591-78-6	2-Hexanone	100	U
127-18-4	Tetrachloroethene	100	U
79-34-5	1,1,2,2-Tetrachloroethane	100	U
108-88-3	Toluene	100	U
108-90-7	Chlorobenzene	100	U
100-41-4	Ethylbenzene	100	U
100-42-5	Styrene	100	U
1330-20-7	Xylene (total)	100	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94854

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: ______ SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924968

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: F1486.D

Level: (low/med) LOW Date Received: 08/24/99

% Moisture: not dec. ______ Date Analyzed: 08/27/99

GC Column: RTX624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	3	J
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94855

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924969

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: F1493.D

Level: (low/med) LOW Date Received: 08/24/99

% Moisture: not dec. Date Analyzed: 08/27/99

GC Column: RTX624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	3	J
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	1	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94857

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924971

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: F1489.D

Level: (low/med) LOW Date Received: 08/24/99

% Moisture: not dec. Date Analyzed: 08/27/99

GC Column: RTX624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/L Q

74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94856

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924970

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: F1488.D

Level: (low/med) LOW Date Received: 08/24/99

% Moisture: not dec. Date Analyzed: 08/27/99

GC Column: RTX624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	1	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94858

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924972

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: F1490.D

Level: (low/med) LOW Date Received: 08/24/99

% Moisture: not dec. Date Analyzed: 08/27/99

GC Column: RTX624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/L Q

74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94859

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: ______ SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924973

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: F1491.D

Level: (low/med) LOW Date Received: 08/24/99

% Moisture: not dec. ______ Date Analyzed: 08/27/99

GC Column: RTX624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	6	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	2	J
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	19	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94860

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924974

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: F1492.D

Level: (low/med) LOW Date Received: 08/24/99

% Moisture: not dec. Date Analyzed: 08/27/99

GC Column: RTX624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	7	J
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	1	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	11	
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	21	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EW1B

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: ______ SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9923516

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A24289.D

Level: (low/med) LOW Date Received: 08/10/99

% Moisture: not dec. ______ Date Analyzed: 08/17/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	33	
75-34-3	1,1-Dichloroethane	5	J
540-59-0	1,2-Dichloroethene (total)	68	
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	56	
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	90	
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	750	E
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EW1BDL

Lab Name: H2M LABS,INC   Contract: C003786

Lab Code: 10478   Case No.: RA099   SAS No.: ______   SDG No.: 0809

Matrix: (soil/water) WATER   Lab Sample ID: 9923516DL

Sample wt/vol: 5.0 (g/ml) ML   Lab File ID: A24297.D

Level: (low/med) LOW   Date Received: 08/10/99

% Moisture: not dec. ______   Date Analyzed: 08/17/99

GC Column: RTX502. ID: 0.53 (mm)   Dilution Factor: 5.0

Soil Extract Volume: ______ (uL)   Soil Aliquot Volume: ______ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	50	U
74-83-9	Bromomethane	50	U
75-01-4	Vinyl Chloride	50	U
75-00-3	Chloroethane	50	U
75-09-2	Methylene Chloride	50	U
67-64-1	Acetone	50	U
75-15-0	Carbon Disulfide	50	U
75-35-4	1,1-Dichloroethene	31	JD
75-34-3	1,1-Dichloroethane	5	JD
540-59-0	1,2-Dichloroethene (total)	68	D
78-93-3	2-Butanone	50	U
67-66-3	Chloroform	50	U
107-06-2	1,2-Dichloroethane	50	U
71-55-6	1,1,1-Trichloroethane	54	D
56-23-5	Carbon Tetrachloride	50	U
75-27-4	Bromodichloromethane	50	U
78-87-5	1,2-Dichloropropane	50	U
10061-01-5	cis-1,3-Dichloropropene	50	U
79-01-6	Trichloroethene	88	D
71-43-2	Benzene	50	U
124-48-1	Dibromochloromethane	50	U
10061-02-6	trans-1,3-Dichloropropene	50	U
79-00-5	1,1,2-Trichloroethane	50	U
75-25-2	Bromoform	50	U
108-10-1	4-Methyl-2-Pentanone	50	U
591-78-6	2-Hexanone	50	U
127-18-4	Tetrachloroethene	780	D
79-34-5	1,1,2,2-Tetrachloroethane	50	U
108-88-3	Toluene	50	U
108-90-7	Chlorobenzene	50	U
100-41-4	Ethylbenzene	50	U
100-42-5	Styrene	50	U
1330-20-7	Xylene (total)	50	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EW1C

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9923517

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A24293.D

Level: (low/med) LOW Date Received: 08/10/99

% Moisture: not dec. Date Analyzed: 08/17/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EW2B

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9923518

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A24294.D

Level: (low/med) LOW Date Received: 08/10/99

% Moisture: not dec. Date Analyzed: 08/17/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	53	
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	7	J
75-34-3	1,1-Dichloroethane	3	J
540-59-0	1,2-Dichloroethene (total)	32	
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	1	J
71-55-6	1,1,1-Trichloroethane	7	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	130	
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	20	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	2	J
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EW2C

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9923519

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A24295.D

Level: (low/med) LOW Date Received: 08/10/99

% Moisture: not dec. Date Analyzed: 08/17/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/L Q

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N11861

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: ____ SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9923523

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A24301.D

Level: (low/med) LOW Date Received: 08/10/99

% Moisture: not dec. ____ Date Analyzed: 08/17/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ____ (uL) Soil Aliquot Volume: ____ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N9937

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9923524

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A24302.D

Level: (low/med) LOW Date Received: 08/10/99

% Moisture: not dec. Date Analyzed: 08/17/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	39	
75-34-3	1,1-Dichloroethane	48	
540-59-0	1,2-Dichloroethene (total)	2	J
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	2	J
71-55-6	1,1,1-Trichloroethane	300	E
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	29	
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	14	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N9937DL

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9923524DL

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A24317.D

Level: (low/med) LOW Date Received: 08/10/99

% Moisture: not dec. Date Analyzed: 08/18/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 2.5

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/L Q

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	25	U
74-83-9	Bromomethane	25	U
75-01-4	Vinyl Chloride	25	U
75-00-3	Chloroethane	25	U
75-09-2	Methylene Chloride	25	U
67-64-1	Acetone	25	U
75-15-0	Carbon Disulfide	25	U
75-35-4	1,1-Dichloroethene	40	D
75-34-3	1,1-Dichloroethane	49	D
540-59-0	1,2-Dichloroethene (total)	25	U
78-93-3	2-Butanone	25	U
67-66-3	Chloroform	25	U
107-06-2	1,2-Dichloroethane	25	U
71-55-6	1,1,1-Trichloroethane	320	D
56-23-5	Carbon Tetrachloride	25	U
75-27-4	Bromodichloromethane	25	U
78-87-5	1,2-Dichloropropane	25	U
10061-01-5	cis-1,3-Dichloropropene	25	U
79-01-6	Trichloroethene	31	D
71-43-2	Benzene	25	U
124-48-1	Dibromochloromethane	25	U
10061-02-6	trans-1,3-Dichloropropene	25	U
79-00-5	1,1,2-Trichloroethane	25	U
75-25-2	Bromoform	25	U
108-10-1	4-Methyl-2-Pentanone	25	U
591-78-6	2-Hexanone	25	U
127-18-4	Tetrachloroethene	15	JD
79-34-5	1,1,2,2-Tetrachloroethane	25	U
108-88-3	Toluene	25	U
108-90-7	Chlorobenzene	25	U
100-41-4	Ethylbenzene	25	U
100-42-5	Styrene	25	U
1330-20-7	Xylene (total)	25	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N9938

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9923525

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A24292.D

Level: (low/med) LOW Date Received: 08/10/99

% Moisture: not dec. Date Analyzed: 08/17/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	2	J
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	44	
75-34-3	1,1-Dichloroethane	51	
540-59-0	1,2-Dichloroethene (total)	2	J
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	2	J
71-55-6	1,1,1-Trichloroethane	320	E
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	31	
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	15	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N9938DL

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9923525DL

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A24298.D

Level: (low/med) LOW Date Received: 08/10/99

% Moisture: not dec. Date Analyzed: 08/17/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 2.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	20	U
74-83-9	Bromomethane	20	U
75-01-4	Vinyl Chloride	20	U
75-00-3	Chloroethane	20	U
75-09-2	Methylene Chloride	20	U
67-64-1	Acetone	20	U
75-15-0	Carbon Disulfide	20	U
75-35-4	1,1-Dichloroethene	33	D
75-34-3	1,1-Dichloroethane	46	D
540-59-0	1,2-Dichloroethene (total)	20	U
78-93-3	2-Butanone	20	U
67-66-3	Chloroform	20	U
107-06-2	1,2-Dichloroethane	2	JD
71-55-6	1,1,1-Trichloroethane	280	D
56-23-5	Carbon Tetrachloride	20	U
75-27-4	Bromodichloromethane	20	U
78-87-5	1,2-Dichloropropane	20	U
10061-01-5	cis-1,3-Dichloropropene	20	U
79-01-6	Trichloroethene	27	D
71-43-2	Benzene	20	U
124-48-1	Dibromochloromethane	20	U
10061-02-6	trans-1,3-Dichloropropene	20	U
79-00-5	1,1,2-Trichloroethane	20	U
75-25-2	Bromoform	20	U
108-10-1	4-Methyl-2-Pentanone	20	U
591-78-6	2-Hexanone	20	U
127-18-4	Tetrachloroethene	14	JD
79-34-5	1,1,2,2-Tetrachloroethane	20	U
108-88-3	Toluene	20	U
108-90-7	Chlorobenzene	20	U
100-41-4	Ethylbenzene	20	U
100-42-5	Styrene	20	U
1330-20-7	Xylene (total)	20	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N9939

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9923526

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A24303.D

Level: (low/med) LOW Date Received: 08/10/99

% Moisture: not dec. Date Analyzed: 08/17/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	2	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NRMW1

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9923520

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A24296.D

Level: (low/med) LOW Date Received: 08/10/99

% Moisture: not dec. Date Analyzed: 08/17/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	1	J
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NRMW2

Lab Name: H2M LABS,INC   Contract: C003786

Lab Code: 10478   Case No.: RA099   SAS No.: ______   SDG No.: 0809

Matrix: (soil/water) WATER   Lab Sample ID: 9923521

Sample wt/vol: 5.0 (g/ml) ML   Lab File ID: A24299.D

Level: (low/med) LOW   Date Received: 08/10/99

% Moisture: not dec. ______   Date Analyzed: 08/17/99

GC Column: RTX502. ID: 0.53 (mm)   Dilution Factor: 1.0

Soil Extract Volume: ______ (uL)   Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NRMW3

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9923522

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A24300.D

Level: (low/med) LOW Date Received: 08/10/99

% Moisture: not dec. Date Analyzed: 08/17/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TB1

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: ______ SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9923527

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A24304.D

Level: (low/med) LOW Date Received: 08/10/99

% Moisture: not dec. ______ Date Analyzed: 08/17/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TB2

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9923882

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A24311.D

Level: (low/med) LOW Date Received: 08/13/99

% Moisture: not dec. Date Analyzed: 08/17/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	2	J
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94814

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9923876

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A24305.D

Level: (low/med) LOW Date Received: 08/13/99

% Moisture: not dec. Date Analyzed: 08/17/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94815

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9923877

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A24306.D

Level: (low/med) LOW Date Received: 08/13/99

% Moisture: not dec. Date Analyzed: 08/17/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94816

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9923878

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A24307.D

Level: (low/med) LOW Date Received: 08/13/99

% Moisture: not dec. Date Analyzed: 08/17/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	8	J
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94817

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9923879

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A24308.D

Level: (low/med) LOW Date Received: 08/13/99

% Moisture: not dec. Date Analyzed: 08/17/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	2	J
75-34-3	1,1-Dichloroethane	3	J
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	45	
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	22	
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	26	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94818

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9923880

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A24309.D

Level: (low/med) LOW Date Received: 08/13/99

% Moisture: not dec. Date Analyzed: 08/17/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	2	J
75-34-3	1,1-Dichloroethane	3	J
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	42	
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	21	
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	24	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94819

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9923881

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A24310.D

Level: (low/med) LOW Date Received: 08/13/99

% Moisture: not dec. Date Analyzed: 08/17/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94820

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924243

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A24319.D

Level: (low/med) LOW Date Received: 08/17/99

% Moisture: not dec. Date Analyzed: 08/18/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94821

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924244

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A24320.D

Level: (low/med) LOW Date Received: 08/17/99

% Moisture: not dec. Date Analyzed: 08/18/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	20	
75-34-3	1,1-Dichloroethane	7	J
540-59-0	1,2-Dichloroethene (total)	2	J
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	1	J
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	97	
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	20	
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	11	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94822

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA099 SAS No.: ______ SDG No.: 0809

Matrix: (soil/water) WATER Lab Sample ID: 9924245

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A24321.D

Level: (low/med) LOW Date Received: 08/17/99

% Moisture: not dec. ______ Date Analyzed: 08/18/99

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

H2M LABS, INC.

SDG NARRATIVE FOR VOLATILE ORGANICS
CONTRACT #: C003786
CASE #: RA000
SDG #: 0110
SAMPLES RECEIVED: 1/11, 1/13, 1/14 & 1/18/00

For Samples:

B94801	B94808 (TB-1)	B94815	B94823
B94802	B94809	B94816	B94824
B94803	B94810	B94817	B94825
B94804	B94811	B94818	B94826
B94805	B94812	B94819	B94827
B94806	B94813	B94820	B94828
B94807	B94814	B94821	B94829

The above samples were analyzed according to the requirements of the NYSDWEC ASP 10/95 method 624 for the priority pollutant volatile organic analytes plus xylenes.

Sample B94801 was analyzed as the matrix spike/matrix spike duplicate. All percent recovery and RPD criteria were met.

Due to concentration levels of targeted analytes above the calibration range the following samples were reanalyzed at a dilution: B94816, B94824, B94825 and B94827. Both sets of data are submitted.

A lab fortified blank was analyzed. All percent recoveries were within QC limits except for a 69% recovery for methylene chloride in the LFB of 1/18 (lower limit 76%).

All other quality control and calibration requirements were met.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

Date Reported: February 21, 2000

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Joann M.Slavin
Quality Assurance Manager

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H2M LABS, INC.

SDG NARRATIVE FOR GC VOLATILE ORGANICS
CONTRACT #: C003786
CASE #: RA000
SDG #: 0110
SAMPLES RECEIVED: 1/11, 1/13, 1/14 & 1/18/00

For Samples:

B94801	B94808 (TB-1)	B94815	B94823
B94802	B94809	B94816	B94824
B94803	B94810	B94817	B94825
B94804	B94811	B94818	B94826
B94805	B94812	B94819	B94827
B94806	B94813	B94820	B94828
B94807	B94814	B94821	B94829

The above samples were analyzed for dissolved methane ethane and ethene according to the requirements of method RSKSOP-175. The method employs analysis of headspace with back-calculation of the water concentration by means of the Henry's law. Parameters used in the computations are summarized in spreadsheets, and the formula is presented in Section IV under Calculation.

QC DATA

No QC limits have been established due to insufficient number of data points. Surrogate recoveries for propene and spike recoveries for the lab fortified blank and the spiked sample duplicates indicate good method efficiency. Sample B94801 was analyzed as the matrix spike/matrix spike duplicate.

CALIBRATION

The multi-point calibrations showed linear responses.

SAMPLE ANALYSIS

No problems were encountered.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

Date Reported: February 21, 2000

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****
Joann M.Slavin
Quality Assurance Manager

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H2M LABS, INC.

SDG NARRATIVE FOR METALS
CONTRACT #: C003786
CASE #: RA000
SDG #: 0110
SAMPLES RECEIVED: 1/11, 1/13, 1/14 & 1/18/00

For Samples:

B94801	B94806	B94813	B94818	B94825
B94802	B94807	B94814	B94819	B94826
B94803	B94810	B94815	B94820	B94827
B94804	B94811	B94816	B94823	B94828
B94805	B94812	B94817	B94824	B94829

Twenty five water samples were received by H2M Labs, Inc. on 1/11, 1/13, 1/14 & 1/18/00 for arsenic, iron and manganese metals analysis.

The samples were prepared and analyzed using the following method: ICP analysis was performed on a TJA61E Trace Analyzer using method 6010B.

Sample B94801 (20000112-062) was utilized for duplicate and spike QC reporting.

No problems were noted during the analysis of this sample group.

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Date Reported: February 21, 2000

Vincent Stancampiano
Vice President

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H2M LABS, INC.

SDG NARRATIVE FOR WET CHEMISTRY ANALYSIS
CONTRACT #: C003786
CASE #: RA000
SDG #: 0110
SAMPLES RECEIVED: 1/11, 1/13, 1/14 & 1/18/00

For Samples:

B94801	B94806	B94813	B94818	B94825
B94802	B94807	B94814	B94819	B94826
B94803	B94810	B94815	B94820	B94827
B94804	B94811	B94816	B94823	B94828
B94805	B94812	B94817	B94824	B94829

Twenty five water samples were received by H2M Labs, Inc. on 1/11, 1/13, 1/14 & 1/18/00 for select wet chemistry analysis.

The samples were prepared and analyzed using methods listed on the report forms.

Sample B94801 (20000112-062) was utilized for duplicate and spike QC reporting.

Sulfate method 375.4 was utilized for confirmation and reporting of samples B94826, B94827 and B94828.

No other problems were noted during the analysis of this sample group.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

Date Reported: February 21, 2000

Vincent Stancampiano
Vice President

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94801

Lab Name: H2M LABS.INC Contract: C003786

Lab Code: H2M Case No.: RA000 SAS No.: SDG No.: 0110

Matrix: (soil/water) WATER Lab Sample ID: 20000112-062

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25666.D

Level: (low/med) LOW Date Received: 01/11/00

% Moisture: not dec. Date Analyzed: 01/18/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-4	1,1-Dichloroethane	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	10	
71-43-2	Benzene	5	U
124-48-1	Dibromochloromethane	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
79-00-5	1,1,2-Trichloroethane	5	U
75-25-2	Bromoform	5	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
1330-20-7	Xylene (total)	5	U
75-694	Trichlorofluoromethane	10	U
156-60-5	trans-1,2-Dichloroethene	5	U
110-75-8	2-Chloroethylvinylether	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94802

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0110

Matrix: (soil/water) WATER Lab Sample ID: 20000112-063

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25648.D

Level: (low/med) LOW Date Received: 01/11/00

% Moisture: not dec. Date Analyzed: 01/17/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/L Q

74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-4	1,1-Dichloroethane	5	U
75-694	Trichlorofluoromethane	10	U
156-60-5	trans-1,2-Dichloroethene	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
110-75-8	2-Chloroethylvinylether	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
71-43-2	Benzene	5	U
124-48-1	Dibromochloromethane	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
79-00-5	1,1,2-Trichloroethane	5	U
75-25-2	Bromoform	5	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
1330-20-7	Xylene (total)	5	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94803

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0110

Matrix: (soil/water) WATER Lab Sample ID: 20000112-064

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25649.D

Level: (low/med) LOW Date Received: 01/11/00

% Moisture: not dec. Date Analyzed: 01/17/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-4	1,1-Dichloroethane	5	U
75-694	Trichlorofluoromethane	10	U
156-60-5	trans-1,2-Dichloroethene	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
110-75-8	2-Chloroethylvinylether	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
71-43-2	Benzene	5	U
124-48-1	Dibromochloromethane	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
79-00-5	1,1,2-Trichloroethane	5	U
75-25-2	Bromoform	5	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
1330-20-7	Xylene (total)	5	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94804

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: H2M Case No.: RA000 SAS No.: SDG No.: 0110

Matrix: (soil/water) WATER Lab Sample ID: 20000112-065

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25661.D

Level: (low/med) LOW Date Received: 01/11/00

% Moisture: not dec. Date Analyzed: 01/18/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/L Q

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-4	1,1-Dichloroethane	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
71-43-2	Benzene	5	U
124-48-1	Dibromochloromethane	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
79-00-5	1,1,2-Trichloroethane	5	U
75-25-2	Bromoform	5	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
1330-20-7	Xylene (total)	2	JB
75-694	Trichlorofluoromethane	10	U
156-60-5	trans-1,2-Dichloroethene	5	U
110-75-8	2-Chloroethylvinylether	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94805

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: H2M Case No.: RA000 SAS No.: SDG No.: 0110

Matrix: (soil/water) WATER Lab Sample ID: 20000112-066

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25663.D

Level: (low/med) LOW Date Received: 01/11/00

% Moisture: not dec. Date Analyzed: 01/18/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-4	1,1-Dichloroethane	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
71-43-2	Benzene	5	U
124-48-1	Dibromochloromethane	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
79-00-5	1,1,2-Trichloroethane	5	U
75-25-2	Bromoform	5	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
1330-20-7	Xylene (total)	5	U
75-694	Trichlorofluoromethane	10	U
156-60-5	trans-1,2-Dichloroethene	5	U
110-75-8	2-Chloroethylvinylether	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94806

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: H2M Case No.: RA000 SAS No.: SDG No.: 0110

Matrix: (soil/water) WATER Lab Sample ID: 20000112-067

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25664.D

Level: (low/med) LOW Date Received: 01/11/00

% Moisture: not dec. Date Analyzed: 01/18/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-4	1,1-Dichloroethane	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
71-43-2	Benzene	5	U
124-48-1	Dibromochloromethane	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
79-00-5	1,1,2-Trichloroethane	5	U
75-25-2	Bromoform	5	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
1330-20-7	Xylene (total)	5	U
75-694	Trichlorofluoromethane	10	U
156-60-5	trans-1,2-Dichloroethene	5	U
110-75-8	2-Chloroethylvinylether	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94807

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: H2M Case No.: RA000 SAS No.: SDG No.: 0110

Matrix: (soil/water) WATER Lab Sample ID: 20000112-068

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25665.D

Level: (low/med) LOW Date Received: 01/11/00

% Moisture: not dec. Date Analyzed: 01/18/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-4	1,1-Dichloroethane	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
71-43-2	Benzene	5	U
124-48-1	Dibromochloromethane	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
79-00-5	1,1,2-Trichloroethane	5	U
75-25-2	Bromoform	5	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
1330-20-7	Xylene (total)	5	U
75-694	Trichlorofluoromethane	10	U
156-60-5	trans-1,2-Dichloroethene	5	U
110-75-8	2-Chloroethylvinylether	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94808(TB1)

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: H2M Case No.: RA000 SAS No.: SDG No.: 0110

Matrix: (soil/water) WATER Lab Sample ID: 20000112-074

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25669.D

Level: (low/med) LOW Date Received: 01/11/00

% Moisture: not dec. Date Analyzed: 01/18/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-4	1,1-Dichloroethane	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
71-43-2	Benzene	5	U
124-48-1	Dibromochloromethane	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
79-00-5	1,1,2-Trichloroethane	5	U
75-25-2	Bromoform	5	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
1330-20-7	Xylene (total)	5	U
75-694	Trichlorofluoromethane	10	U
156-60-5	trans-1,2-Dichloroethene	5	U
110-75-8	2-Chloroethylvinylether	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94809

Lab Name: H2M LABS,INC   Contract: C003786

Lab Code: H2M   Case No.: RA000   SAS No.:   SDG No.: 0110

Matrix: (soil/water) WATER   Lab Sample ID: 20000114-011

Sample wt/vol: 5.0 (g/ml) ML   Lab File ID: A25673.D

Level: (low/med) LOW   Date Received: 01/13/00

% Moisture: not dec.   Date Analyzed: 01/18/00

GC Column: RTX502. ID: 0.53 (mm)   Dilution Factor: 1.0

Soil Extract Volume: (uL)   Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-4	1,1-Dichloroethane	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
71-43-2	Benzene	5	U
124-48-1	Dibromochloromethane	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
79-00-5	1,1,2-Trichloroethane	5	U
75-25-2	Bromoform	5	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
1330-20-7	Xylene (total)	5	U
75-694	Trichlorofluoromethane	10	U
156-60-5	trans-1,2-Dichloroethene	5	U
110-75-8	2-Chloroethylvinylether	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94810

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: H2M Case No.: RA000 SAS No.: SDG No.: 0110

Matrix: (soil/water) WATER Lab Sample ID: 20000114-003

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25675.D

Level: (low/med) LOW Date Received: 01/13/00

% Moisture: not dec. Date Analyzed: 01/18/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-4	1,1-Dichloroethane	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
71-43-2	Benzene	5	U
124-48-1	Dibromochloromethane	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
79-00-5	1,1,2-Trichloroethane	5	U
75-25-2	Bromoform	5	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
1330-20-7	Xylene (total)	5	U
75-694	Trichlorofluoromethane	10	U
156-60-5	trans-1,2-Dichloroethene	5	U
110-75-8	2-Chloroethylvinylether	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94811

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: H2M Case No.: RA000 SAS No.: SDG No.: 0110

Matrix: (soil/water) WATER Lab Sample ID: 20000114-004

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25676.D

Level: (low/med) LOW Date Received: 01/13/00

% Moisture: not dec. Date Analyzed: 01/18/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-4	1,1-Dichloroethane	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
71-43-2	Benzene	5	U
124-48-1	Dibromochloromethane	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
79-00-5	1,1,2-Trichloroethane	5	U
75-25-2	Bromoform	5	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
1330-20-7	Xylene (total)	5	U
75-694	Trichlorofluoromethane	10	U
156-60-5	trans-1,2-Dichloroethene	5	U
110-75-8	2-Chloroethylvinylether	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94812

Lab Name: H2M LABS.INC Contract: C003786

Lab Code: H2M Case No.: RA000 SAS No.: SDG No.: 0110

Matrix: (soil/water) WATER Lab Sample ID: 20000114-005

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25677.D

Level: (low/med) LOW Date Received: 01/13/00

% Moisture: not dec. Date Analyzed: 01/18/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-4	1,1-Dichloroethane	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
71-43-2	Benzene	5	U
124-48-1	Dibromochloromethane	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
79-00-5	1,1,2-Trichloroethane	5	U
75-25-2	Bromoform	5	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
1330-20-7	Xylene (total)	5	U
75-694	Trichlorofluoromethane	10	U
156-60-5	trans-1,2-Dichloroethene	5	U
110-75-8	2-Chloroethylvinylether	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94813

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: H2M Case No.: RA000 SAS No.: SDG No.: 0110

Matrix: (soil/water) WATER Lab Sample ID: 20000114-006

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25678.D

Level: (low/med) LOW Date Received: 01/13/00

% Moisture: not dec. Date Analyzed: 01/18/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-4	1,1-Dichloroethane	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
71-43-2	Benzene	5	U
124-48-1	Dibromochloromethane	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
79-00-5	1,1,2-Trichloroethane	5	U
75-25-2	Bromoform	5	U
127-18-4	Tetrachloroethene	1	J
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
1330-20-7	Xylene (total)	5	U
75-694	Trichlorofluoromethane	10	U
156-60-5	trans-1,2-Dichloroethene	5	U
110-75-8	2-Chloroethylvinylether	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94814

Lab Name: H2M LAGS,INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0110

Matrix: (soil/water) WATER Lab Sample ID: 20000114-007

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: P13784.D

Level: (low/med) LOW Date Received: 01/13/00

% Moisture: not dec. Date Analyzed: 01/20/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-4	1,1-Dichloroethane	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
71-43-2	Benzene	5	U
124-48-1	Dibromochloromethane	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
79-00-5	1,1,2-Trichloroethane	5	U
75-25-2	Bromoform	5	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
75-694	Trichlorofluoromethane	10	U
110-75-8	2-Chloroethylvinylether	10	U
156-60-5	trans-1,2-Dichloroethene	5	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
1330-20-7	Xylene (total)	5	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94815

Lab Name: H2M LAGS,INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0110

Matrix: (soil/water) WATER Lab Sample ID: 20000114-008

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: P13785.D

Level: (low/med) LOW Date Received: 01/13/00

% Moisture: not dec. Date Analyzed: 01/20/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-4	1,1-Dichloroethane	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	2	J
71-43-2	Benzene	5	U
124-48-1	Dibromochloromethane	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
79-00-5	1,1,2-Trichloroethane	5	U
75-25-2	Bromoform	5	U
127-18-4	Tetrachloroethene	52	
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
75-694	Trichlorofluoromethane	10	U
110-75-8	2-Chloroethylvinylether	10	U
156-60-5	trans-1,2-Dichloroethene	5	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
1330-20-7	Xylene (total)	5	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94816

Lab Name: H2M LAGS,INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0110

Matrix: (soil/water) WATER Lab Sample ID: 20000114-009

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: P13786.D

Level: (low/med) LOW Date Received: 01/13/00

% Moisture: not dec. Date Analyzed: 01/20/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
75-35-4	1,1-Dichloroethene	51	
75-34-4	1,1-Dichloroethane	8	
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
71-55-6	1,1,1-Trichloroethane	85	
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	150	
71-43-2	Benzene	5	U
124-48-1	Dibromochloromethane	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
79-00-5	1,1,2-Trichloroethane	5	U
75-25-2	Bromoform	5	U
127-18-4	Tetrachloroethene	910	E
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
75-694	Trichlorofluoromethane	10	U
110-75-8	2-Chloroethylvinylether	10	U
156-60-5	trans-1,2-Dichloroethene	1	J
541-73-1	1,3-Dichlorobenzene	4	J
106-46-7	1,4-Dichlorobenzene	1	J
95-50-1	1,2-Dichlorobenzene	10	U
1330-20-7	Xylene (total)	5	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94816DL

Lab Name: H2M LAGS,INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0110

Matrix: (soil/water) WATER Lab Sample ID: 20000114-009

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: P13788.D

Level: (low/med) LOW Date Received: 01/13/00

% Moisture: not dec. Date Analyzed: 01/20/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 20.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	200	U
74-83-9	Bromomethane	200	U
75-01-4	Vinyl Chloride	200	U
75-00-3	Chloroethane	200	U
75-09-2	Methylene Chloride	100	U
75-35-4	1,1-Dichloroethene	35	JD
75-34-4	1,1-Dichloroethane	100	U
67-66-3	Chloroform	100	U
107-06-2	1,2-Dichloroethane	100	U
71-55-6	1,1,1-Trichloroethane	63	JD
56-23-5	Carbon Tetrachloride	100	U
75-27-4	Bromodichloromethane	100	U
78-87-5	1,2-Dichloropropane	100	U
10061-01-5	cis-1,3-Dichloropropene	100	U
79-01-6	Trichloroethene	130	D
71-43-2	Benzene	100	U
124-48-1	Dibromochloromethane	100	U
10061-02-6	trans-1,3-Dichloropropene	100	U
79-00-5	1,1,2-Trichloroethane	100	U
75-25-2	Bromoform	100	U
127-18-4	Tetrachloroethene	1100	D
79-34-5	1,1,2,2-Tetrachloroethane	100	U
108-88-3	Toluene	100	U
108-90-7	Chlorobenzene	100	U
100-41-4	Ethylbenzene	100	U
75-694	Trichlorofluoromethane	200	U
110-75-8	2-Chloroethylvinylether	200	U
156-60-5	trans-1,2-Dichloroethene	100	U
541-73-1	1,3-Dichlorobenzene	200	U
106-46-7	1,4-Dichlorobenzene	200	U
95-50-1	1,2-Dichlorobenzene	200	U
1330-20-7	Xylene (total)	100	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94817

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: H2M Case No.: RA000 SAS No.: SDG No.: 0110

Matrix: (soil/water) WATER Lab Sample ID: 20000114-010

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25674.D

Level: (low/med) LOW Date Received: 01/13/00

% Moisture: not dec. Date Analyzed: 01/18/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	6	J
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
75-35-4	1,1-Dichloroethene	6	
75-34-4	1,1-Dichloroethane	3	J
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
71-55-6	1,1,1-Trichloroethane	8	
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	41	
71-43-2	Benzene	5	U
124-48-1	Dibromochloromethane	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
79-00-5	1,1,2-Trichloroethane	5	U
75-25-2	Bromoform	5	U
127-18-4	Tetrachloroethene	10	
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
1330-20-7	Xylene (total)	5	U
75-694	Trichlorofluoromethane	10	U
156-60-5	trans-1,2-Dichloroethene	5	U
110-75-8	2-Chloroethylvinylether	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U

S 0134

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94818

Lab Name: H2M LAGS,INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0110

Matrix: (soil/water) WATER Lab Sample ID: 20000114-056

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: P13789.D

Level: (low/med) LOW Date Received: 01/14/00

% Moisture: not dec. Date Analyzed: 01/20/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
75-35-4	1,1-Dichloroethene	6	
75-34-4	1,1-Dichloroethane	3	J
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
71-55-6	1,1,1-Trichloroethane	41	
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	2	J
71-43-2	Benzene	5	U
124-48-1	Dibromochloromethane	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
79-00-5	1,1,2-Trichloroethane	5	U
75-25-2	Bromoform	5	U
127-18-4	Tetrachloroethene	3	J
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
75-694	Trichlorofluoromethane	10	U
110-75-8	2-Chloroethylvinylether	10	U
156-60-5	trans-1,2-Dichloroethene	5	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
1330-20-7	Xylene (total)	5	U

S 0139

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94819

Lab Name: H2M LAGS.INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0110

Matrix: (soil/water) WATER Lab Sample ID: 20000114-066

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: P13790.D

Level: (low/med) LOW Date Received: 01/14/00

% Moisture: not dec. Date Analyzed: 01/20/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-4	1,1-Dichloroethane	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
71-43-2	Benzene	5	U
124-48-1	Dibromochloromethane	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
79-00-5	1,1,2-Trichloroethane	5	U
75-25-2	Bromoform	5	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
75-694	Trichlorofluoromethane	10	U
110-75-8	2-Chloroethylvinylether	10	U
156-60-5	trans-1,2-Dichloroethene	5	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
1330-20-7	Xylene (total)	5	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94820

Lab Name: H2M LAGS,INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0110

Matrix: (soil/water) WATER Lab Sample ID: 20000114-057

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: P13791.D

Level: (low/med) LOW Date Received: 01/14/00

% Moisture: not dec. Date Analyzed: 01/20/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-4	1,1-Dichloroethane	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	2	J
71-43-2	Benzene	5	U
124-48-1	Dibromochloromethane	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
79-00-5	1,1,2-Trichloroethane	5	U
75-25-2	Bromoform	5	U
127-18-4	Tetrachloroethene	3	J
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
75-694	Trichlorofluoromethane	10	U
110-75-8	2-Chloroethylvinylether	10	U
156-60-5	trans-1,2-Dichloroethene	5	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1.2-Dichlorobenzene	10	U
1330-20-7	Xylene (total)	5	U

S 0147

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94821

Lab Name: H2M LAGS,INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0110

Matrix: (soil/water) WATER Lab Sample ID: 20000114-058

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: P13792.D

Level: (low/med) LOW Date Received: 01/14/00

% Moisture: not dec. Date Analyzed: 01/20/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
75-35-4	1,1-Dichloroethene	16	
75-34-4	1,1-Dichloroethane	23	
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	1	J
71-55-6	1,1,1-Trichloroethane	120	
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	10	
71-43-2	Benzene	5	U
124-48-1	Dibromochloromethane	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
79-00-5	1,1,2-Trichloroethane	5	U
75-25-2	Bromoform	5	U
127-18-4	Tetrachloroethene	9	
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
75-694	Trichlorofluoromethane	10	U
110-75-8	2-Chloroethylvinylether	10	U
156-60-5	trans-1,2-Dichloroethene	5	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
1330-20-7	Xylene (total)	5	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94823

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: H2M Case No.: RA000 SAS No.: SDG No.: 0110

Matrix: (soil/water) WATER Lab Sample ID: 20000119-034

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25800.D

Level: (low/med) LOW Date Received: 01/18/00

% Moisture: not dec. Date Analyzed: 01/24/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
75-35-4	1,1-Dichloroethene	17	
75-34-4	1,1-Dichloroethane	9	
67-66-3	Chloroform	2	J
107-06-2	1,2-Dichloroethane	5	U
71-55-6	1,1,1-Trichloroethane	50	
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	98	
71-43-2	Benzene	5	U
124-48-1	Dibromochloromethane	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
79-00-5	1,1,2-Trichloroethane	5	U
75-25-2	Bromoform	5	U
127-18-4	Tetrachloroethene	150	
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
1330-20-7	Xylene (total)	5	U
75-694	Trichlorofluoromethane	10	U
156-60-5	trans-1,2-Dichloroethene	5	U
110-75-8	2-Chloroethylvinylether	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U

S 0157

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94824

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: H2M Case No.: RA000 SAS No.: SDG No.: 0110

Matrix: (soil/water) WATER Lab Sample ID: 20000119-035

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25801.D

Level: (low/med) LOW Date Received: 01/18/00

% Moisture: not dec. Date Analyzed: 01/24/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	61	
75-09-2	Methylene Chloride	7	
75-35-4	1,1-Dichloroethene	3400	E
75-34-4	1,1-Dichloroethane	3200	E
67-66-3	Chloroform	5	
107-06-2	1,2-Dichloroethane	11	
71-55-6	1,1,1-Trichloroethane	32000	E
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	4	J
71-43-2	Benzene	5	U
124-48-1	Dibromochloromethane	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
79-00-5	1,1,2-Trichloroethane	5	U
75-25-2	Bromoform	5	U
127-18-4	Tetrachloroethene	12	
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
1330-20-7	Xylene (total)	5	U
75-694	Trichlorofluoromethane	10	U
156-60-5	trans-1,2-Dichloroethene	5	U
110-75-8	2-Chloroethylvinylether	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94825

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: H2M Case No.: RA000 SAS No.: SDG No.: 0110

Matrix: (soil/water) WATER Lab Sample ID: 20000119-036

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25805.D

Level: (low/med) LOW Date Received: 01/18/00

% Moisture: not dec. Date Analyzed: 01/24/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
75-35-4	1,1-Dichloroethene	60	
75-34-4	1,1-Dichloroethane	27	
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
71-55-6	1,1,1-Trichloroethane	570	E
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	2	J
71-43-2	Benzene	5	U
124-48-1	Dibromochloromethane	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
79-00-5	1,1,2-Trichloroethane	5	U
75-25-2	Bromoform	5	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
1330-20-7	Xylene (total)	5	U
75-694	Trichlorofluoromethane	10	U
156-60-5	trans-1,2-Dichloroethene	5	U
110-75-8	2-Chloroethylvinylether	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U

S 0169

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94826

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: H2M Case No.: RA000 SAS No.: SDG No.: 0110

Matrix: (soil/water) WATER Lab Sample ID: 20000119-037

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25806.D

Level: (low/med) LOW Date Received: 01/18/00

% Moisture: not dec. Date Analyzed: 01/24/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
75-35-4	1,1-Dichloroethene	2	J
75-34-4	1,1-Dichloroethane	4	J
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
71-55-6	1,1,1-Trichloroethane	52	
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	20	
71-43-2	Benzene	5	U
124-48-1	Dibromochloromethane	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
79-00-5	1,1,2-Trichloroethane	5	U
75-25-2	Bromoform	5	U
127-18-4	Tetrachloroethene	26	
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
1330-20-7	Xylene (total)	5	U
75-694	Trichlorofluoromethane	10	U
156-60-5	trans-1,2-Dichloroethene	5	U
110-75-8	2-Chloroethylvinylether	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94827

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: H2M Case No.: RA000 SAS No.: SDG No.: 0110

Matrix: (soil/water) WATER Lab Sample ID: 20000119-038

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25807.D

Level: (low/med) LOW Date Received: 01/18/00

% Moisture: not dec. Date Analyzed: 01/24/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
75-35-4	1,1-Dichloroethene	150	
75-34-4	1,1-Dichloroethane	94	
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
71-55-6	1,1,1-Trichloroethane	2800	E
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	10	
71-43-2	Benzene	5	U
124-48-1	Dibromochloromethane	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
79-00-5	1,1,2-Trichloroethane	5	U
75-25-2	Bromoform	5	U
127-18-4	Tetrachloroethene	29	
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
1330-20-7	Xylene (total)	5	U
75-694	Trichlorofluoromethane	10	U
156-60-5	trans-1,2-Dichloroethene	5	U
110-75-8	2-Chloroethylvinylether	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94827DL

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: H2M Case No.: RA000 SAS No.: SDG No.: 0110

Matrix: (soil/water) WATER Lab Sample ID: 20000119-038

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25818.D

Level: (low/med) LOW Date Received: 01/18/00

% Moisture: not dec. Date Analyzed: 01/25/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 20.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	200	U
74-83-9	Bromomethane	200	U
75-01-4	Vinyl Chloride	200	U
75-00-3	Chloroethane	200	U
75-09-2	Methylene Chloride	100	U
75-35-4	1,1-Dichloroethene	59	JD
75-34-4	1,1-Dichloroethane	61	JD
67-66-3	Chloroform	100	U
107-06-2	1,2-Dichloroethane	100	U
71-55-6	1,1,1-Trichloroethane	1500	D
56-23-5	Carbon Tetrachloride	100	U
75-27-4	Bromodichloromethane	100	U
78-87-5	1,2-Dichloropropane	100	U
10061-01-5	cis-1,3-Dichloropropene	100	U
79-01-6	Trichloroethene	100	U
71-43-2	Benzene	100	U
124-48-1	Dibromochloromethane	100	U
10061-02-6	trans-1,3-Dichloropropene	100	U
79-00-5	1,1,2-Trichloroethane	100	U
75-25-2	Bromoform	100	U
127-18-4	Tetrachloroethene	100	U
79-34-5	1,1,2,2-Tetrachloroethane	100	U
108-88-3	Toluene	100	U
108-90-7	Chlorobenzene	100	U
100-41-4	Ethylbenzene	100	U
1330-20-7	Xylene (total)	100	U
75-694	Trichlorofluoromethane	200	U
156-60-5	trans-1,2-Dichloroethene	100	U
110-75-8	2-Chloroethylvinylether	200	U
541-73-1	1,3-Dichlorobenzene	200	U
106-46-7	1,4-Dichlorobenzene	200	U
95-50-1	1,2-Dichlorobenzene	200	U

S 0183

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94828

Lab Name: H2M LABS.INC Contract: C003786

Lab Code: H2M Case No.: RA000 SAS No.: SDG No.: 0110

Matrix: (soil/water) WATER Lab Sample ID: 20000119-039

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25808.D

Level: (low/med) LOW Date Received: 01/18/00

% Moisture: not dec. Date Analyzed: 01/24/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-4	1,1-Dichloroethane	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
71-55-6	1,1,1-Trichloroethane	2	J
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	7	
71-43-2	Benzene	5	U
124-48-1	Dibromochloromethane	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
79-00-5	1,1,2-Trichloroethane	5	U
75-25-2	Bromoform	5	U
127-18-4	Tetrachloroethene	37	
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
1330-20-7	Xylene (total)	5	U
75-694	Trichlorofluoromethane	10	U
156-60-5	trans-1,2-Dichloroethene	5	U
110-75-8	2-Chloroethylvinylether	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94829

Lab Name: H2M LABS,INC Contract: C003786

Lab Code: H2M Case No.: RA000 SAS No.: ______ SDG No.: 0110

Matrix: (soil/water) WATER Lab Sample ID: 20000119-040

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25809.D

Level: (low/med) LOW Date Received: 01/18/00

% Moisture: not dec. ______ Date Analyzed: 01/24/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-4	1,1-Dichloroethane	5	U
67-66-3	Chloroform	6	
107-06-2	1,2-Dichloroethane	5	U
71-55-6	1,1,1-Trichloroethane	2	J
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
71-43-2	Benzene	5	U
124-48-1	Dibromochloromethane	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
79-00-5	1,1,2-Trichloroethane	5	U
75-25-2	Bromoform	5	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
1330-20-7	Xylene (total)	5	U
75-694	Trichlorofluoromethane	10	U
156-60-5	trans-1,2-Dichloroethene	5	U
110-75-8	2-Chloroethylvinylether	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U

S 0193

H2M LABS, INC.

SDG NARRATIVE FOR VOLATILES
CONTRACT: C003786
CASE NO.: RA000
SDG NO.: 0120
SAMPLES RECEIVED: 1/21/00 and 1/25/00

For Samples:

B94830	B94837
B94831	B94838
B94832	B94839 (TB-6)
B94833	B94840
B94834	B94841
B94835 MS/MSD	B94842
B94836	

The above samples were analyzed according to the requirements of the NYSDEC ASP 10/95 method 95-1 for the TCL volatile organic analytes.

Sample B94835 was analyzed as the matrix spike/matrix spike duplicate. All percent recoveries and RPD's were met.

Due to concentration levels of targeted analytes above the calibration range, the following samples were reanalyzed at a dilution:

B94836, B94837, B94838, B94840 and B94841

Both sets of data are submitted.

All quality control and calibration requirements were met.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

Date Reported: February 15, 2000

JD for
Joann M. Slavin

Joann M. Slavin
Quality Assurance Manager

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94830

Lab Name: H2M LABS, INC   Contract: C003786

Lab Code: 10478   Case No.: RA000   SAS No.:   SDG No.: 0120

Matrix: (soil/water) WATER   Lab Sample ID: 00000121-077

Sample wt/vol: 5.0 (g/ml) ML   Lab File ID: A25832.D

Level: (low/med) LOW   Date Received: 01/21/00

% Moisture: not dec.   Date Analyzed: 01/25/00

GC Column: RTX502. ID: 0.53 (mm)   Dilution Factor: 1.0

Soil Extract Volume: (uL)   Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	3	J
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	2	J
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94831

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0120

Matrix: (soil/water) WATER Lab Sample ID: 20000121-078

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25836.D

Level: (low/med) LOW Date Received: 01/21/00

% Moisture: not dec. Date Analyzed: 01/26/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94832

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0120

Matrix: (soil/water) WATER Lab Sample ID: 20000121-079

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25837.D

Level: (low/med) LOW Date Received: 01/21/00

% Moisture: not dec. Date Analyzed: 01/26/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94833

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0120

Matrix: (soil/water) WATER Lab Sample ID: 20000121-080

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25838.D

Level: (low/med) LOW Date Received: 01/21/00

% Moisture: not dec. Date Analyzed: 01/26/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	2	J
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94834

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0120

Matrix: (soil/water) WATER Lab Sample ID: 20000121-081

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25839.D

Level: (low/med) LOW Date Received: 01/21/00

% Moisture: not dec. Date Analyzed: 01/26/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	25	
75-34-4	1,1-Dichloroethane	13	
540-59-0	1,2-Dichloroethene (total)	2	J
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	21	
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	19	
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	6	J
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94835

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0120

Matrix: (soil/water) WATER Lab Sample ID: 0121-082

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25829.D

Level: (low/med) LOW Date Received: 01/21/00

% Moisture: not dec. Date Analyzed: 01/25/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	24	
75-34-4	1,1-Dichloroethane	12	
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	21	
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	17	
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	J
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94836

Lab Name: H2M LABS, INC   Contract: C003786

Lab Code: 10478   Case No.: RA000   SAS No.:   SDG No.: 0120

Matrix: (soil/water) WATER   Lab Sample ID: 20000121-083

Sample wt/vol: 5.0 (g/ml) ML   Lab File ID: A25841.D

Level: (low/med) LOW   Date Received: 01/21/00

% Moisture: not dec.   Date Analyzed: 01/26/00

GC Column: RTX502. ID: 0.53 (mm)   Dilution Factor: 1.0

Soil Extract Volume: ______ (uL)   Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	2	J
75-09-2	Methylene Chloride	1	J
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	300	E
75-34-4	1,1-Dichloroethane	110	
540-59-0	1,2-Dichloroethene (total)	29	
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	3	J
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	200	E
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	240	E
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	1	J
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	51	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94836DL

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0120

Matrix: (soil/water) WATER Lab Sample ID: 0121-083DL

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25848.D

Level: (low/med) LOW Date Received: 01/21/00

% Moisture: not dec. Date Analyzed: 01/26/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 2.5

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	25	U
74-83-9	Bromomethane	25	U
75-01-4	Vinyl Chloride	25	U
75-00-3	Chloroethane	25	U
75-09-2	Methylene Chloride	25	U
67-64-1	Acetone	25	U
75-15-0	Carbon Disulfide	25	U
75-35-4	1,1-Dichloroethene	260	D
75-34-4	1,1-Dichloroethane	110	D
540-59-0	1,2-Dichloroethene (total)	28	D
78-93-3	2-Butanone	25	U
67-66-3	Chloroform	3	JD
107-06-2	1,2-Dichloroethane	25	U
71-55-6	1,1,1-Trichloroethane	180	D
56-23-5	Carbon Tetrachloride	25	U
75-27-4	Bromodichloromethane	25	U
78-87-5	1,2-Dichloropropane	25	U
10061-01-5	cis-1,3-Dichloropropene	25	U
79-01-6	Trichloroethene	220	D
71-43-2	Benzene	25	U
124-48-1	Dibromochloromethane	25	U
10061-02-6	trans-1,3-Dichloropropene	25	U
79-00-5	1,1,2-Trichloroethane	25	U
75-25-2	Bromoform	25	U
108-10-1	4-Methyl-2-Pentanone	25	U
591-78-6	2-Hexanone	25	U
127-18-4	Tetrachloroethene	46	D
79-34-5	1,1,2,2-Tetrachloroethane	25	U
108-88-3	Toluene	25	U
108-90-7	Chlorobenzene	25	U
100-41-4	Ethylbenzene	25	U
100-42-5	Styrene	25	U
1330-20-7	Xylene (total)	25	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94837

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0120

Matrix: (soil/water) WATER Lab Sample ID: 20000121-084

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25842.D

Level: (low/med) LOW Date Received: 01/21/00

% Moisture: not dec. Date Analyzed: 01/26/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	3	J
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	630	E
75-34-4	1,1-Dichloroethane	230	E
540-59-0	1,2-Dichloroethene (total)	65	
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	6	J
107-06-2	1,2-Dichloroethane	4	J
71-55-6	1,1,1-Trichloroethane	330	E
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	570	E
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	2	J
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	86	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	2	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94837DL

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0120

Matrix: (soil/water) WATER Lab Sample ID: 0121-084DL

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25849.D

Level: (low/med) LOW Date Received: 01/21/00

% Moisture: not dec. Date Analyzed: 01/26/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 5.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	50	U
74-83-9	Bromomethane	50	U
75-01-4	Vinyl Chloride	50	U
75-00-3	Chloroethane	50	U
75-09-2	Methylene Chloride	50	U
67-64-1	Acetone	50	U
75-15-0	Carbon Disulfide	50	U
75-35-4	1,1-Dichloroethene	460	D
75-34-4	1,1-Dichloroethane	190	D
540-59-0	1,2-Dichloroethene (total)	53	D
78-93-3	2-Butanone	50	U
67-66-3	Chloroform	50	U
107-06-2	1,2-Dichloroethane	50	U
71-55-6	1,1,1-Trichloroethane	260	D
56-23-5	Carbon Tetrachloride	50	U
75-27-4	Bromodichloromethane	50	U
78-87-5	1,2-Dichloropropane	50	U
10061-01-5	cis-1,3-Dichloropropene	50	U
79-01-6	Trichloroethene	420	D
71-43-2	Benzene	50	U
124-48-1	Dibromochloromethane	50	U
10061-02-6	trans-1,3-Dichloropropene	50	U
79-00-5	1,1,2-Trichloroethane	50	U
75-25-2	Bromoform	50	U
108-10-1	4-Methyl-2-Pentanone	50	U
591-78-6	2-Hexanone	50	U
127-18-4	Tetrachloroethene	66	D
79-34-5	1,1,2,2-Tetrachloroethane	50	U
108-88-3	Toluene	50	U
108-90-7	Chlorobenzene	50	U
100-41-4	Ethylbenzene	50	U
100-42-5	Styrene	50	U
1330-20-7	Xylene (total)	50	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94838

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0120

Matrix: (soil/water) WATER Lab Sample ID: 20000121-085

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25843.D

Level: (low/med) LOW Date Received: 01/21/00

% Moisture: not dec. Date Analyzed: 01/26/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	3	J
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	490	E
75-34-4	1,1-Dichloroethane	200	
540-59-0	1,2-Dichloroethene (total)	46	
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	5	J
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	340	E
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	400	E
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	2	J
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	76	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94838DL

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: ___ SDG No.: 0120

Matrix: (soil/water) WATER Lab Sample ID: 0121-085DL

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25850.D

Level: (low/med) LOW Date Received: 01/21/00

% Moisture: not dec. ____ Date Analyzed: 01/26/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 5.0

Soil Extract Volume: ____ (uL) Soil Aliquot Volume: ____ (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	50	U
74-83-9	Bromomethane	50	U
75-01-4	Vinyl Chloride	50	U
75-00-3	Chloroethane	50	U
75-09-2	Methylene Chloride	50	U
67-64-1	Acetone	50	U
75-15-0	Carbon Disulfide	50	U
75-35-4	1,1-Dichloroethene	360	D
75-34-4	1,1-Dichloroethane	170	D
540-59-0	1,2-Dichloroethene (total)	35	JD
78-93-3	2-Butanone	50	U
67-66-3	Chloroform	50	U
107-06-2	1,2-Dichloroethane	50	U
71-55-6	1,1,1-Trichloroethane	270	D
56-23-5	Carbon Tetrachloride	50	U
75-27-4	Bromodichloromethane	50	U
78-87-5	1,2-Dichloropropane	50	U
10061-01-5	cis-1,3-Dichloropropene	50	U
79-01-6	Trichloroethene	300	D
71-43-2	Benzene	50	U
124-48-1	Dibromochloromethane	50	U
10061-02-6	trans-1,3-Dichloropropene	50	U
79-00-5	1,1,2-Trichloroethane	50	U
75-25-2	Bromoform	50	U
108-10-1	4-Methyl-2-Pentanone	50	U
591-78-6	2-Hexanone	50	U
127-18-4	Tetrachloroethene	59	D
79-34-5	1,1,2,2-Tetrachloroethane	50	U
108-88-3	Toluene	50	U
108-90-7	Chlorobenzene	50	U
100-41-4	Ethylbenzene	50	U
100-42-5	Styrene	50	U
1330-20-7	Xylene (total)	50	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94839 (TB-6)

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0120

Matrix: (soil/water) WATER Lab Sample ID: 20000125-055

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25844.D

Level: (low/med) LOW Date Received: 01/25/00

% Moisture: not dec. Date Analyzed: 01/26/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94840

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0120

Matrix: (soil/water) WATER Lab Sample ID: 20000125-056

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25845.D

Level: (low/med) LOW Date Received: 01/25/00

% Moisture: not dec. Date Analyzed: 01/26/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	6	J
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	11	
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	2100	E
75-34-4	1,1-Dichloroethane	820	E
540-59-0	1,2-Dichloroethene (total)	94	
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	8	J
107-06-2	1,2-Dichloroethane	16	
71-55-6	1,1,1-Trichloroethane	840	E
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	2500	E
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	6	J
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	180	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	1	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94840DL

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0120

Matrix: (soil/water) WATER Lab Sample ID: 0125-056DL

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25851.D

Level: (low/med) LOW Date Received: 01/25/00

% Moisture: not dec. Date Analyzed: 01/26/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 25.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	250	U
74-83-9	Bromomethane	250	U
75-01-4	Vinyl Chloride	250	U
75-00-3	Chloroethane	250	U
75-09-2	Methylene Chloride	250	U
67-64-1	Acetone	250	U
75-15-0	Carbon Disulfide	250	U
75-35-4	1,1-Dichloroethene	1600	D
75-34-4	1,1-Dichloroethane	750	D
540-59-0	1,2-Dichloroethene (total)	80	JD
78-93-3	2-Butanone	250	U
67-66-3	Chloroform	250	U
107-06-2	1,2-Dichloroethane	250	U
71-55-6	1,1,1-Trichloroethane	790	D
56-23-5	Carbon Tetrachloride	250	U
75-27-4	Bromodichloromethane	250	U
78-87-5	1,2-Dichloropropane	250	U
10061-01-5	cis-1,3-Dichloropropene	250	U
79-01-6	Trichloroethene	1800	D
71-43-2	Benzene	250	U
124-48-1	Dibromochloromethane	250	U
10061-02-6	trans-1,3-Dichloropropene	250	U
79-00-5	1,1,2-Trichloroethane	250	U
75-25-2	Bromoform	250	U
108-10-1	4-Methyl-2-Pentanone	250	U
591-78-6	2-Hexanone	250	U
127-18-4	Tetrachloroethene	150	JD
79-34-5	1,1,2,2-Tetrachloroethane	250	U
108-88-3	Toluene	250	U
108-90-7	Chlorobenzene	250	U
100-41-4	Ethylbenzene	250	U
100-42-5	Styrene	250	U
1330-20-7	Xylene (total)	250	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94841

Lab Name: H2M LABS, INC   Contract: C003786

Lab Code: 10478   Case No.: RA000   SAS No.:   SDG No.: 0120

Matrix: (soil/water) WATER   Lab Sample ID: 20000125-057

Sample wt/vol: 5.0 (g/ml) ML   Lab File ID: A25846.D

Level: (low/med) LOW   Date Received: 01/25/00

% Moisture: not dec.   Date Analyzed: 01/26/00

GC Column: RTX502. ID: 0.53 (mm)   Dilution Factor: 1.0

Soil Extract Volume: (uL)   Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	5	J
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	17	
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	2300	E
75-34-4	1,1-Dichloroethane	1000	E
540-59-0	1,2-Dichloroethene (total)	77	
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	8	J
107-06-2	1,2-Dichloroethane	22	
71-55-6	1,1,1-Trichloroethane	920	E
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	2600	E
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	8	J
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	200	E
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94841DL

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0120

Matrix: (soil/water) WATER Lab Sample ID: 0125-057DL

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25852.D

Level: (low/med) LOW Date Received: 01/25/00

% Moisture: not dec. Date Analyzed: 01/26/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 25.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	250	U
74-83-9	Bromomethane	250	U
75-01-4	Vinyl Chloride	250	U
75-00-3	Chloroethane	250	U
75-09-2	Methylene Chloride	250	U
67-64-1	Acetone	250	U
75-15-0	Carbon Disulfide	250	U
75-35-4	1,1-Dichloroethene	1700	D
75-34-4	1,1-Dichloroethane	880	D
540-59-0	1,2-Dichloroethene (total)	64	JD
78-93-3	2-Butanone	250	U
67-66-3	Chloroform	250	U
107-06-2	1,2-Dichloroethane	250	U
71-55-6	1,1,1-Trichloroethane	820	D
56-23-5	Carbon Tetrachloride	250	U
75-27-4	Bromodichloromethane	250	U
78-87-5	1,2-Dichloropropane	250	U
10061-01-5	cis-1,3-Dichloropropene	250	U
79-01-6	Trichloroethene	1800	D
71-43-2	Benzene	250	U
124-48-1	Dibromochloromethane	250	U
10061-02-6	trans-1,3-Dichloropropene	250	U
79-00-5	1,1,2-Trichloroethane	250	U
75-25-2	Bromoform	250	U
108-10-1	4-Methyl-2-Pentanone	250	U
591-78-6	2-Hexanone	250	U
127-18-4	Tetrachloroethene	160	JD
79-34-5	1,1,2,2-Tetrachloroethane	250	U
108-88-3	Toluene	250	U
108-90-7	Chlorobenzene	250	U
100-41-4	Ethylbenzene	250	U
100-42-5	Styrene	250	U
1330-20-7	Xylene (total)	250	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94842

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0120

Matrix: (soil/water) WATER Lab Sample ID: 20000125-058

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: A25853.D

Level: (low/med) LOW Date Received: 01/25/00

% Moisture: not dec. Date Analyzed: 01/26/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	4	J
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	4	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	6	J
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

H2M LABS, INC.

SDG NARRATIVE FOR VOLATILES
CONTRACT: C003786
CASE NO.: RA000
SDG NO.: 0128
SAMPLES RECEIVED: 1/28, 2/1 & 2/4/00

For Samples:

B94843	B94850	B94857
B94844	B94851	B94858
B94845	B94852	B94859
B94846	B94853	B94860
B94847	B94854 (TB-8)	B94861
B94848	B94855	B94862
B94849	B94856 MS/MSD	B94863

The above samples were analyzed according to the requirements of the NYSDEC ASP 10/95 method 95-1 for the TCL volatile organic analytes.

Sample B94856 was analyzed as the matrix spike/matrix spike duplicate sample. All percent recoveries and RPD's were met except for a 33% RPD for 1,1-dichloroethene (upper limit 14%), a 122% recovery for trichloroethene (upper limit 120%) and a 128% recovery for toluene (upper limit 125%) in the matrix spike duplicate.

Samples B94857 and B94859 were reanalyzed at a dilution due to concentration levels of targeted analytes above the calibration range. Both sets of data are submitted.

All other quality control and calibration requirements were met.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

Date Reported: March 1, 2000

Joann M. Slavin
Quality Assurance Manager

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94843

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: ______ SDG No.: 0128

Matrix: (soil/water) WATER Lab Sample ID: 20000128-254

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: P13908.D

Level: (low/med) LOW Date Received: 01/28/00

% Moisture: not dec. ______ Date Analyzed: 02/01/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94844

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0128

Matrix: (soil/water) WATER Lab Sample ID: 20000128-255

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: P13909.D

Level: (low/med) LOW Date Received: 01/28/00

% Moisture: not dec. Date Analyzed: 02/01/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94845

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0128

Matrix: (soil/water) WATER Lab Sample ID: 20000128-256

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: P13910.D

Level: (low/med) LOW Date Received: 01/28/00

% Moisture: not dec. Date Analyzed: 02/01/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/L Q

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94846

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0128

Matrix: (soil/water) WATER Lab Sample ID: 20000128-257

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: P13911.D

Level: (low/med) LOW Date Received: 01/28/00

% Moisture: not dec. Date Analyzed: 02/01/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94847

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: ____ SDG No.: 0128

Matrix: (soil/water) WATER Lab Sample ID: 20000202-001

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: P13976.D

Level: (low/med) LOW Date Received: 02/01/00

% Moisture: not dec. ____ Date Analyzed: 02/04/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ____ (uL) Soil Aliquot Volume: ____ (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	2	J
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94848

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: ______ SDG No.: 0128

Matrix: (soil/water) WATER Lab Sample ID: 20000202-002

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: P13977.D

Level: (low/med) LOW Date Received: 02/01/00

% Moisture: not dec. ______ Date Analyzed: 02/04/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	8	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94849

Lab Name: H2M LABS, INC   Contract: C003786

Lab Code: 10478   Case No.: RA000   SAS No.: ____   SDG No.: 0128

Matrix: (soil/water) WATER   Lab Sample ID: 20000202-003

Sample wt/vol: 5.0 (g/ml) ML   Lab File ID: P13978.D

Level: (low/med) LOW   Date Received: 02/01/00

% Moisture: not dec. ____   Date Analyzed: 02/04/00

GC Column: RTX502. ID: 0.53 (mm)   Dilution Factor: 1.0

Soil Extract Volume: ____ (uL)   Soil Aliquot Volume: ____ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	3	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	1	J
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	3	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94850

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0128

Matrix: (soil/water) WATER Lab Sample ID: 20000202-004

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: P13979.D

Level: (low/med) LOW Date Received: 02/01/00

% Moisture: not dec. Date Analyzed: 02/04/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	2	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	1	J
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
1u0-42-5	Styrene	10	U
1330-20-7	Xylene (total)	3	J

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94851

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0128

Matrix: (soil/water) WATER Lab Sample ID: 20000202-005

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: P13980.D

Level: (low/med) LOW Date Received: 02/01/00

% Moisture: not dec. Date Analyzed: 02/04/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	2	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	1	J
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	3	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94852

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: ______ SDG No.: 0128

Matrix: (soil/water) WATER Lab Sample ID: 20000202-006

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: P13981.D

Level: (low/med) LOW Date Received: 02/01/00

% Moisture: not dec. ______ Date Analyzed: 02/04/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/L Q

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94853

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0128

Matrix: (soil/water) WATER Lab Sample ID: 20000202-007

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: P13982.D

Level: (low/med) LOW Date Received: 02/01/00

% Moisture: not dec. Date Analyzed: 02/04/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	4	J
75-34-4	1,1-Dichloroethane	2	J
540-59-0	1,2-Dichloroethene (total)	2	J
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	8	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	J
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94854(TB-8)

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: ______ SDG No.: 0128

Matrix: (soil/water) WATER Lab Sample ID: 20000204-077

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: P14046.D

Level: (low/med) LOW Date Received: 02/04/00

% Moisture: not dec. ______ Date Analyzed: 02/10/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94855

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0128

Matrix: (soil/water) WATER Lab Sample ID: 20000204-078

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: P14047.D

Level: (low/med) LOW Date Received: 02/04/00

% Moisture: not dec. Date Analyzed: 02/10/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	6	J
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94856

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0128

Matrix: (soil/water) WATER Lab Sample ID: 20000204-079

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: P14048.D

Level: (low/med) LOW Date Received: 02/04/00

% Moisture: not dec. Date Analyzed: 02/10/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	2	J
75-34-4	1,1-Dichloroethane	2	J
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	23	
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	1	J
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94857

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0128

Matrix: (soil/water) WATER Lab Sample ID: 20000204-080

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: P14051.D

Level: (low/med) LOW Date Received: 02/04/00

% Moisture: not dec. Date Analyzed: 02/10/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	24	
75-34-4	1,1-Dichloroethane	46	
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	300	E
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	6	J
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	11	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94857DL

Lab Name: H2M LABS, INC   Contract: C003786

Lab Code: 10478   Case No.: RA000   SAS No.: ______   SDG No.: 0128

Matrix: (soil/water) WATER   Lab Sample ID: 0204-080DL

Sample wt/vol: 5.0 (g/ml) ML   Lab File ID: P14058.D

Level: (low/med) LOW   Date Received: 02/04/00

% Moisture: not dec. ______   Date Analyzed: 02/10/00

GC Column: RTX502. ID: 0.53 (mm)   Dilution Factor: 2.5

Soil Extract Volume: ______ (uL)   Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	25	U
74-83-9	Bromomethane	25	U
75-01-4	Vinyl Chloride	25	U
75-00-3	Chloroethane	25	U
75-09-2	Methylene Chloride	25	U
67-64-1	Acetone	25	U
75-15-0	Carbon Disulfide	25	U
75-35-4	1,1-Dichloroethene	17	JD
75-34-4	1,1-Dichloroethane	38	D
540-59-0	1,2-Dichloroethene (total)	25	U
78-93-3	2-Butanone	25	U
67-66-3	Chloroform	25	U
107-06-2	1,2-Dichloroethane	25	U
71-55-6	1,1,1-Trichloroethane	230	D
56-23-5	Carbon Tetrachloride	25	U
75-27-4	Bromodichloromethane	25	U
78-87-5	1,2-Dichloropropane	25	U
10061-01-5	cis-1,3-Dichloropropene	25	U
79-01-6	Trichloroethene	4	JD
71-43-2	Benzene	25	U
124-48-1	Dibromochloromethane	25	U
10061-02-6	trans-1,3-Dichloropropene	25	U
79-00-5	1,1,2-Trichloroethane	25	U
75-25-2	Bromoform	25	U
108-10-1	4-Methyl-2-Pentanone	25	U
591-78-6	2-Hexanone	25	U
127-18-4	Tetrachloroethene	8	JD
79-34-5	1,1,2,2-Tetrachloroethane	25	U
108-88-3	Toluene	25	U
108-90-7	Chlorobenzene	25	U
100-41-4	Ethylbenzene	25	U
100-42-5	Styrene	25	U
1330-20-7	Xylene (total)	25	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94858

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: ______ SDG No.: 0128

Matrix: (soil/water) WATER Lab Sample ID: 20000204-081

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: P14052.D

Level: (low/med) LOW Date Received: 02/04/00

% Moisture: not dec. ______ Date Analyzed: 02/10/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	2	J
75-34-4	1,1-Dichloroethane	2	J
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	23	
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	1	J
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94859

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: ______ SDG No.: 0128

Matrix: (soil/water) WATER Lab Sample ID: 20000204-082

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: P14053.D

Level: (low/med) LOW Date Received: 02/04/00

% Moisture: not dec. ______ Date Analyzed: 02/10/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	26	
75-34-4	1,1-Dichloroethane	36	
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	310	E
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	7	J
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	16	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94859DL

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: ______ SDG No.: 0128

Matrix: (soil/water) WATER Lab Sample ID: 0204-082DL

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: P14059.D

Level: (low/med) LOW Date Received: 02/04/00

% Moisture: not dec. ______ Date Analyzed: 02/10/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 2.5

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	25	U
74-83-9	Bromomethane	25	U
75-01-4	Vinyl Chloride	25	U
75-00-3	Chloroethane	25	U
75-09-2	Methylene Chloride	25	U
67-64-1	Acetone	25	U
75-15-0	Carbon Disulfide	25	U
75-35-4	1,1-Dichloroethene	18	JD
75-34-4	1,1-Dichloroethane	29	D
540-59-0	1,2-Dichloroethene (total)	25	U
78-93-3	2-Butanone	25	U
67-66-3	Chloroform	25	U
107-06-2	1,2-Dichloroethane	25	U
71-55-6	1,1,1-Trichloroethane	230	D
56-23-5	Carbon Tetrachloride	25	U
75-27-4	Bromodichloromethane	25	U
78-87-5	1,2-Dichloropropane	25	U
10061-01-5	cis-1,3-Dichloropropene	25	U
79-01-6	Trichloroethene	5	JD
71-43-2	Benzene	25	U
124-48-1	Dibromochloromethane	25	U
10061-02-6	trans-1,3-Dichloropropene	25	U
79-00-5	1,1,2-Trichloroethane	25	U
75-25-2	Bromoform	25	U
108-10-1	4-Methyl-2-Pentanone	25	U
591-78-6	2-Hexanone	25	U
127-18-4	Tetrachloroethene	12	JD
79-34-5	1,1,2,2-Tetrachloroethane	25	U
108-88-3	Toluene	25	U
108-90-7	Chlorobenzene	25	U
100-41-4	Ethylbenzene	25	U
100-42-5	Styrene	25	U
1330-20-7	Xylene (total)	25	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94860

Lab Name: H2M LABS, INC   Contract: C003786

Lab Code: 10478   Case No.: RA000   SAS No.: ______   SDG No.: 0128

Matrix: (soil/water) WATER   Lab Sample ID: 20000204-083

Sample wt/vol: 5.0 (g/ml) ML   Lab File ID: P14054.D

Level: (low/med) LOW   Date Received: 02/04/00

% Moisture: not dec. ______   Date Analyzed: 02/10/00

GC Column: RTX502. ID: 0.53 (mm)   Dilution Factor: 1.0

Soil Extract Volume: ______ (uL)   Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	3	J
75-34-4	1,1-Dichloroethane	2	J
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	38	
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	21	
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	59	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94861

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: SDG No.: 0128

Matrix: (soil/water) WATER Lab Sample ID: 20000204-084

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: P14055.D

Level: (low/med) LOW Date Received: 02/04/00

% Moisture: not dec. Date Analyzed: 02/10/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	7	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	32	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94862

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: ______ SDG No.: 0128

Matrix: (soil/water) WATER Lab Sample ID: 20000204-085

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: P14056.D

Level: (low/med) LOW Date Received: 02/04/00

% Moisture: not dec. ______ Date Analyzed: 02/10/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	2	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	2	J
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	7	J
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B94863

Lab Name: H2M LABS, INC Contract: C003786

Lab Code: 10478 Case No.: RA000 SAS No.: ______ SDG No.: 0128

Matrix: (soil/water) WATER Lab Sample ID: 20000204-086

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: P14057.D

Level: (low/med) LOW Date Received: 02/04/00

% Moisture: not dec. ______ Date Analyzed: 02/10/00

GC Column: RTX502. ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-4	1,1-Dichloroethane	1	J
540-59-0	1,2-Dichloroethene (total)	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
71-55-6	1,1,1-Trichloroethane	9	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	3	J
71-43-2	Benzene	10	U
124-48-1	Dibromochloromethane	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	9	J
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

APPENDIX F

HISTORICAL GROUNDWATER DATA SUMMARY

TABLE 5-2
SUMMARY TABLE OF DATABASE

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
101-DW-00 (SW)	12/4/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
101-DW-2 (SW)	8/24/1998	0	0	0	0	0	0		0		0												
101-DW-3 (SW)	8/24/1998	6	1	0	0	5	0		0		0												
101-DW-5 (SW)	8/24/1998	6	1	0	0	6	0		0		0												
101-DW-7 (SW)	8/24/1998	13	0	0	0	13	0		0		0												
101-DW-8 (SW)	8/24/1998	1	1	0	0	0	0		0		0												
101-DW-9 (SW)	8/18/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
101-DW-N/S (SW)	7/12/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
101-DWA-1 (63-64')	8/24/1998	14	3	0	0	0	0		12		0												
101-DWA-1 (79-80')	8/24/1998	10	0	0	0	0	0		10		0												
101-DWA-1 (94-95')	8/24/1998	2	1	0	0	0	0		1		0												
101-DWA-12 (63-64')	9/15/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
101-DWA-12 (79-80')	9/15/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
101-DWA-12 (90-91')	9/15/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
101-DWA-13 (63-64')	9/16/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
101-DWA-13 (79-80')	9/16/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
101-DWA-13 (90-91')	9/16/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
101-DWA-4 (63-64')	8/24/1998	6	0	0	0	0	0		6		0				0	0	0		0	0			
101-DWA-4 (79-80')	8/24/1998	2	0	0	0	0	0		2		0				0	0	0		0	0			
101-DWA-4 (92-93')	8/24/1998	8	1	1	0	0	0		5		0				0	0	0		0	0			
101-DWA-6 (63-64')	8/24/1998	27	1	0	0	0	0		26		0				0	0	0		0	0			
101-DWA-6 (79-80')	8/24/1998	14	1	1	0	0	0		12		0				0	0	0		0	0			
101-DWA-6 (93-94')	8/24/1998	4	0	3	0	0	0		1		0				0	0	0		0	0			
101-DWA-7 (63-64')	9/16/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
101-DWA-7 (80-81')	9/16/1998	13	0	0			0	0	13	0	0	0	0	0	0	0	0	0			0	0	0
101-DWA-7 (90-91')	9/16/1998	554	20	20			20	0	20	0	0	0	0	0	0	0	0	0			400	0	0
101-DWA-8 (63-64')	8/24/1998	9	1	1	0	0	0		7		0				0	0	0		0	0			
101-DWA-8 (79-80')	9/1/1998	53	0	0			0	0	38	0	0	0	0	0	0	0	0	0			15	0	0
101-DWA-8 (93-94')	8/24/1998	6	6	0	0	0	0		0		0				0	0	0		0	0			
101-DWA-N/S (63-64')	8/24/1998	24	20	2	0	0	0		2		0												
101-DWA-N/S (79-80')	8/24/1998	128	83	6	0	0	0		39		0												
101-DWA-N/S (94-95')	8/24/1998	10	4	1	0	0	0		5		0												
101DW00_SW-01	12/4/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
89-DW-10 (SW)	7/9/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
89-DW-11 (SW)	7/9/1998	17	0	0			0	0	0	0	0	0	0	0	0	0	0	0			17	0	0
89-DW-12 (SW)	7/9/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
89-DW-14 (SW)	7/10/1998	21	21	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
89-DW-15 (SW)	7/9/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
89-DW-16 (SW)	7/8/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
89-DW-2 (SW)	7/11/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
89-DW-7 (SW)	7/11/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
89-DW-9 (SW)	7/12/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
89-DWA-1 (60-65')	8/24/1998	6	6	0	0	0	0		0		0				0	0	0		0	0			
89-DWA-1 (78')	8/24/1998	4	4	0	0	0	0		0		0				0	0	0		0	0			
89-DWA-1 (92')	8/24/1998	13	12	1	0	0	0		0		0				0	0	0		0	0			
89-DWA-10 (60-65')	8/24/1998	5,345	4,986	359	0	0	0		0		0				0	0	0		0	0			
89-DWA-10 (78')	8/24/1998	2,071	1,792	0	0	0	0		279		0				0	0	0		0	0			
89-DWA-10 (92')	8/24/1998	2,899	2,830	69	0	0	0		0		0				0	0	0		0	0			
89-DWA-11 (63-64')	8/24/1998	302	271	28	0	0	0		3		0				0	0	0		0	0			
89-DWA-11 (79-80')	8/24/1998	452	356	21	0	0	0		75		0				0	0	0		0	0			
89-DWA-11 (93-94')	8/24/1998	330	291	23	0	0	0		16		0				0	0	0		0	0			
89-DWA-12 (63-64')	8/24/1998	68	50	9	0	0	0		9		0												
89-DWA-12 (79-80')	8/24/1998	54	10	1	0	0	7		36		0												
89-DWA-12 (93-94')	8/24/1998	42	14	9	0	0	0		19		0												
89-DWA-14 (60-65')	9/2/1998	5,600	5,600	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
89-DWA-14 (78')	8/24/1998	354	143	0	0	0	0		211		0				0	0	0		0	0			
89-DWA-14 (92')	8/24/1998	599	351	25	0	0	0		223		0				0	0	0		0	0			
89-DWA-15 (60-65')	8/24/1998	3,064	1,855	1,200	0	0	0		9		0				0	0	0		0	0			
89-DWA-15 (78')	8/24/1998	554	351	13	0	0	0		190		0				0	0	0		0	0			
89-DWA-15 (92')	8/24/1998	958	347	11	0	0	0		545		0				0	0	0		0	0			
89-DWA-16 (79-80')	8/24/1998	404	289	14	0	0	0		101		0				0	0	0		0	0			
89-DWA-16 (93-94')	8/24/1998	552	395	69	0	0	0		88		0				0	0	0		0	0			
89-DWA-17 (60-65')	8/24/1998	779	471	304	0	0	0		4		0				0	0	0		0	0			
89-DWA-17 (78')	8/24/1998	347	292	9	0	0	0		47		0				0	0	0		0	0			
89-DWA-17 (92')	8/24/1998	528	389	110	0	0	0		29		0												
89-DWA-2 (93-94')	8/24/1998	0	0	0	0	0	0		0		0												
89-DWA-4 (63-64')	8/24/1998	1	1	0	0	0	0		0		0				0	0	0		0	0			
89-DWA-4 (79-80')	8/24/1998	1	1	0	0	0	0		0		0				0	0	0		0	0			

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.
(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
N/A - Not applicable.
GV - Guidance Value

R2-0001067

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
NYSDEC Class GA Standards (a)			5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
89-DWA-4 (93-94')	8/24/1998	1	1	0	0	0	0		0		0				0	0	0		0	0			
89-DWA-5 (63-64')	8/24/1998	0	0	0	0	0	0		0		0				0	0	0		0	0			
89-DWA-5 (79-80')	8/24/1998	1	1	0	0	0	0		0		0				0	0	0		0	0			
89-DWA-5 (93-94')	8/24/1998	3	3	0	0	0	0		0		0				0	0	0		0	0			
89-DWA-6 (60-65')	8/24/1998	1	1	0	0	0	0		0		0				0	0	0		0	0			
89-DWA-6 (78')	8/24/1998	1	1	0	0	0	0		0		0				0	0	0		0	0			
89-DWA-6 (92')	8/24/1998	1	1	0	0	0	0		0		0				0	0	0		0	0			
89-DWA-7 (63-64')	8/24/1998	0	0	0	0	0	0		0		0												
89-DWA-7 (79-80')	8/24/1998	1	1	0	0	0	0		0		0												
89-DWA-7 (93-94')	8/24/1998	4	4	0	0	0	0		0		0												
89-DWA-8 (63-64')	8/24/1998	1	1	0	0	0	0		0		0												
89-DWA-8 (79-80')	8/11/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
89-DWA-8 (93-94')	8/24/1998	1	1	0	0	0	0		0		0												
ADCHEM MW-1	1/1/1993	124	36	19			0	10	47		0		0		0	0	0		0	0			
ADCHEM MW-2	1/1/1993	20	11	0			0	0	9		0		0		0	0	0		0	0			
ADCHEM MW-3	1/1/1993	110	23	19			3	6	51		0		0		0	0	0		0	0			
AGGW-01 (56-60')	11/11/1998	212	10	0	0	0	0	10	0	0	0	0	0	0	0	0	0	2	0	0	150	0	0
AGGW-01 (76-80')	11/11/1998	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AGGW-03 (56-60')	11/11/1998	413	30	310	0	0	0	10	47	0	0	0	0	0	0	0	0	0	0	0	16	0	0
AGGW-03 (66-70')	11/11/1998	16	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AGGW-03 (76-80')	11/11/1998	40	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AGGW-05 (56-60')	11/11/1998	1,000	15	710	0	0	0	13	160	0	0	0	0	0	0	10	0	0	0	0	92	0	0
AGGW-05 (66-70')	11/11/1998	751	17	550	0	0	0	0	17	0	0	0	0	0	0	37	0	0	0	0	130	0	0
AGGW-05 (76-80')	11/11/1998	4,798	56	3,900	0	0	0	0	82	0	0	0	0	0	0	320	0	0	0	0	440	0	0
AGHP-01 (60')	2/24/1998	8	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AGHP-01 (70')	2/24/1998	53	35	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AGHP-01 (90')	2/24/1998	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AGHP-05 (60')	9/22/1997	753	53	570	0	0	0	0	130	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AGHP-05 (70')	9/22/1997	908	48	680	0	0	5	0	170	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AGHP-05 (80')	9/22/1997	1,638	99	1,400	0	0	0	0	100	0	0	0	0	0	0	39	0	0	0	0	0	0	0
AIGPW-1 ((76-77')	10/1/1998	12	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
AIGPW-1 (57-58')	10/1/1998	108	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
AIGPW-1 (67-68')	10/1/1998	11	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
AIGPW-2 (57-58')	10/1/1998	51	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
AIGPW-2 (67-68')	10/1/1998	303	0	0			0	0	0	0	0	0	0	0	0	0	0	0			240	0	0
AIGPW-2 (79-80')	10/1/1998	57	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
AIGPW-3 (57-58')	10/1/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
AIGPW-3 (67-68')	10/1/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
AIGPW-3 (79-80')	10/1/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
AIMW-10A	10/1/1998	73	14	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
AIMW-10B	10/1/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
AIMW-10C	10/1/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
AIMW-11A	10/1/1998	513	57	17			27	0	400	0	0	0	0	0	0	0	0	0			0	0	0
AIMW-11B	10/1/1998	17	0	0			0	0	17	0	0	0	0	0	0	0	0	0			0	0	0
AIMW-11C	10/1/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
AIMW-70-STATE-D	1/1/1993	25	0	2			10	0	11		0		0		0	0	0		0	0			
AIMW-70-STATE-D	12/1/1995	93	0	13	0	0	0		62		0		0		0	0	0		0	0		0	
AIMW-8A	10/1/1998	39	0	39			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
AIMW-8B	10/1/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
AIMW-8C	10/1/1998	71	29	0			21	0	21	0	0	0	0	0	0	0	0	0			0	0	0
AIMW-9A	10/1/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
AIMW-9B	10/1/1998	200	0	0			20	0	180	0	0	0	0	0	0	0	0	0			0	0	0
AIMW-9C	10/1/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
ANSON MW-10	1/1/1993	122	120	1			0	0	0		0		0		1	0	0		0	0			
ANSON MW-2	1/1/1993	0	0	0			0	0	0		0		0		0	0	0		0	0			
ANSON MW-2	1/1/1995	4	2	0			0	0	2	0	0	0	0	0	0	0	0	0			0	0	0
ANSON MW-3	1/1/1993	0	0	0			0	0	0		0		0		0	0	0		0	0			
ANSON MW-3	1/1/1995	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
ANSON MW-4	1/1/1993	1	0	0			1	0	0		0		0		0	0	0		0	0			
ANSON MW-4	1/1/1995	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
ANSON MW-5	1/1/1995	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
ANSON MW-5	8/31/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
ANSON MW-6	1/1/1993	0	0	0			0	0	0		0		0		0	0	0		0	0			
ANSON MW-6	1/1/1995	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
ANSON MW-7	1/1/1993	326	11	15			3	0	270		0		0		0	0	0		0	1			
ANSON MW-7	8/31/1998	159	29	0			0	0	130	0	0	0	0	0	0	0	0	0			0	0	0
ANSON MW-8	1/1/1993	0	0	0			0	0	0		0		0		0	0	0		0	0			
ANSON MW-8	4/13/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

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N/A - Not applicable.

GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
ANSON MW-8	8/19/1999	0	0	0			0	0	0		0	0	0	0	0			0			0	0	
ANSON MW-9	1/1/1993	8	0	0			0	0	8		0		0		0	0	0		0	0			
ANSON MW-9	1/1/1995	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
DOAK MW-1	1/1/1994	237	63	14	0	0	26		134		0		0									0	
DOAK MW-1	1/1/1996	188	52	11			11	4	97		5				0	0	0	0				0	
DOAK MW-1	2/1/1998	109	56	0			0	0	53	0	0	0	0	0	0	0	0	0			0	0	0
DOAK MW-1	8/17/1999	90	47	0			0	0	43		0	0	0	0	0			0			0	0	
DOAK MW-2	1/1/1994	722	42	30	12	0	60		490		0		0									0	
DOAK MW-2	12/1/1995	140	0	0	0	0	0		140		0		0		0	0	0		0	0		0	
DOAK MW-2	1/1/1996	171	19	9			8	5	110		0				0	0	0	0				0	
DOAK MW-2	2/1/1998	58	15	0			0	0	43	0	0	0	0	0	0	0	0	0			0	0	0
DOAK MW-3	12/1/1995	340	0	0	340	0	0		0		0		0		0	0	0		0	0		0	
DOAK MW-3	1/1/1996	542	28	120			0	0	21		370				0	0	0	0				0	
DOAK MW-3	2/1/1998	197	10	29			0	94	39	0	0	0	0	0	0	0	0	0			0	0	0
EW-01C (100')	6/1/1997	674	406	61	96	0	36	0	64	0	0	4	0	0	0	0	0	0	0	0	0	0	0
EW-01C (100)	6/1/1997	674	406	61	96		36		64		0	4										0	
EW-01C (114')	6/1/1997	607	446	41	60	0	16	1	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EW-01C (114)	6/1/1997	607	446	41	60		16		35		0	0										0	
EW-01C (122')	6/1/1997	389	263	29	44	0	17	0	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EW-01C (122)	6/1/1997	389	263	29	44		17		29		0	0										0	
EW-01C (130')	6/1/1997	218	151	15	22	0	10	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EW-01C (130)	6/1/1997	218	151	15	22		10		15		0	0										0	
EW-01C (144')	6/1/1997	985	232	201	353	0	67	0	124	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EW-01C (144)	6/1/1997	985	232	201	353		67		124														
EW-01C (150')	6/1/1997	1,291	459	216	380	0	81	0	147	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EW-01C (150)	6/1/1997	1,291	459	216	380		81		147		0	0										0	
EW-01C (170')	6/1/1997	573	279	93	31	0	51	0	102	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EW-01C (170)	6/1/1997	573	279	93	31		51		102		0	0										0	
EW-01C (210')	6/1/1997	190	79	23	40	0	9	22	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EW-01C (210)	6/1/1997	190	79	23	40		9		13		0	0										0	
EW-01C (300')	6/1/1997	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EW-01C (300)	6/1/1997	1	1	0	0		0		0		0	0										0	
EW-01C (350')	6/1/1997	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EW-01C (350)	6/1/1997	1	1	0	0		0		0		0	0										0	

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

Table 5.2
New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
NYSDEC Class GA Standards (a)			5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
EW-01C (400')	6/1/1997	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EW-01C (400)	6/1/1997	0	0	0	0		0		0		0	0										0	
EW-01C (450')	6/1/1997	18	12	0	3	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0
EW-01C (450)	6/1/1997	18	12	0	3		0		1		0	2										0	
EW-01C (62')	6/1/1997	4	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EW-01C (62)	6/1/1997	4	1	0	0		1		1		0	0										0	
EW-01C (72')	6/1/1997	92	42	20	15	0	5	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EW-01C (72)	6/1/1997	92	42	20	15		5		8		0	0										0	
EW-01C (80')	6/1/1997	166	104	22	18	0	6	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EW-01C (80)	6/1/1997	166	104	22	18		6		14		0	0										0	
EW-01C (95')	6/1/1997	415	283	31	11	0	37	1	41	0	0	1	0	0	0	0	0	0	0	0	0	2	0
EW-01C (95)	6/1/1997	415	283	31	11		37		41		0	1										2	
EW-02C (100')	6/1/1997	294	11	90	82	0	11	0	20	0	0	0	40	0	0	0	0	0	0	0	0	0	0
EW-02C (100)	6/1/1997	294	11	90	82		11		20		0		40			0						0	
EW-02C (110')	6/1/1997	104	0	28	17	0	3	0	7	0	0	0	2	0	0	0	0	0	0	0	0	0	0
EW-02C (110)	6/1/1997	104	0	28	17		3		7		0		2			0						0	
EW-02C (120')	6/1/1997	226	3	81	19	0	8	0	12	0	0	0	6	0	0	0	0	0	0	0	0	0	0
EW-02C (120)	6/1/1997	226	3	81	19		8		12		0		6			0						0	
EW-02C (130')	6/1/1997	961	299	274	165	0	6	0	0	0	0	0	217	0	0	0	0	0	0	0	0	0	0
EW-02C (130)	6/1/1997	961	299	274	165		6		0		0		217			0						0	
EW-02C (140')	6/1/1997	313	25	202	56	0	5	0	3	0	0	0	16	0	0	0	0	0	0	0	0	0	0
EW-02C (140)	6/1/1997	312	25	202	56		5		3		0		16			0						0	
EW-02C (170')	6/1/1997	169	10	79	25	0	0	0	4	0	9	0	0	0	0	1	0	0	0	0	0	0	0
EW-02C (170)	6/1/1997	169	10	79	25		0		4		9		0			1						0	
EW-02C (190')	6/1/1997	187	79	77	14	0	4	0	5	0	0	0	0	0	0	3	0	0	0	0	0	0	0
EW-02C (190)	6/1/1997	187	79	77	14		4		5		0		0			3						0	
EW-02C (212')	6/1/1997	104	37	40	10	0	6	0	9	0	0	0	0	0	0	2	0	0	0	0	0	0	0
EW-02C (212)	6/1/1997	104	37	40	10		6		9		0		0			2						0	
EW-02C (230')	6/1/1997	161	35	87	36	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
EW-02C (230)	6/1/1997	161	35	87	36		1		1		0		0			1						0	
EW-02C (250')	6/1/1997	110	17	59	33	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
EW-02C (250)	6/1/1997	110	0	17	33		0		59		0		0			1						0	
EW-02C (300')	6/1/1997	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EW-02C (300)	6/1/1997	3	2	0	0		0		0		0		0			0						0	

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.
(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
N/A - Not applicable.
GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
EW-02C (400')	6/1/1997	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EW-02C (400)	6/1/1997	2	0	0	0		0		0		0		0			0						0	
EW-02C (62')	6/1/1997	23	7	4	2	0	3	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EW-02C (62)	6/1/1997	23	7	4	2		3		7		0		0			0						0	
EW-02C (80')	6/1/1997	1,010	38	5	0	0	151	0	649	0	5	0	0	0	0	0	0	0	0	0	0	0	0
EW-02C (80)	6/1/1997	1,005	38	5	0		151		649		0		0			0						0	
EW-02C (90')	6/1/1997	557	129	19	22	0	112	0	243	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EW-02C (90)	6/1/1997	557	129	19	22		112		243		0		0			0						0	
EW-1B	11/1/1998	1,060	487	197	138		86		133		0	0	0			0						0	
EW-1B	4/16/1999	836	620	75			27	63	51	0	0	0	0	0	0	0	0	0			0	0	0
EW-1B	8/9/1999	1,002	750	90			33	68	56		0	0	0	0	0			0			0	0	
EW-1C	11/1/1998	9	0	9	0		0		0		0	0	0			0						0	
EW-1C	4/21/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
EW-1C	8/9/1999	10	0	10			0	0	0		0	0	0	0	0			0			0	0	
EW-2B	11/1/1998	757	65	373	79		19		7		3	4	200			0						0	
EW-2B	4/16/1999	446	31	220			0	65	0	0	0	0	130	0	0	0	0	0			0	0	0
EW-2B	8/9/1999	245	20	130			0	32	0		0	0	53	0	0			0			10	0	
EW-2C	11/1/1998	1	0	1	0		0		0		0	0	0			0						0	
EW-2C	4/21/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
EW-2C	8/9/1999	0	0	0			0	0	0		0	0	0	0	0			0			0	0	
EZ-EM MW-2	1/1/1993	71	62	0			0	0	7		0		0		0	0	0		0	0			
EZ-EM MW-2	1/1/1995	17	17	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
EZ-EM UN-4	1/1/1995	441	210	81			0	17	130	2	0	0	0	0	0	0	0	0			0	0	0
EZ-EM UN-4	9/4/1998	547	293	109	0	0	0	24	121	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FG-1 (56-58)	12/17/1998	70	0	0			0		0			0		0		0		0			70	0	0
FG-2 (56-58)	12/17/1998	23	0	0			0		0			0		0		0		0			23	0	0
FG-3 (56-58)	12/17/1998	0	0	0			0		0			0		0		0		0			0	0	0
FG-4 (56-58)	12/18/1998	16	0	0			0		0			0		0		0		0			0	0	0
FG-5 (61-63)	12/18/1998	15	5	0			0		0			0		0		0		0			0	0	0
FG-6 (61-63)	12/16/1998	52	8	0			0		0			0		0		0		0			29	0	0
FG-7 (61-63)	1/8/1999	7	7	0			0		0			0		0		0		0			0	0	0
FG-7 (76-78)	1/8/1999	0	0	0			0		0			0		0		0		0			0	0	0
FG-7 (91-93)	1/8/1999	0	0	0			0		0			0		0		0		0			0	0	0
FG-9 (61-63)	1/8/1999	560	560	0			0		0			0		0		0		0			0	0	0

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

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GV - Guidance Value

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New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
FG-9 (76-78)	1/8/1999	0	0	0			0		0			0		0		0		0			0	0	0
FG-9 (91-93)	1/8/1999	0	0	0			0		0			0		0		0		0			0	0	0
FLGP-W1 (62-63')	9/1/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
FLGP-W1 (72-73')	9/1/1998	41	11	14			0	0	16	0	0	0	0	0	0	0	0	0			0	0	0
FLGP-W1 (92-93')	9/1/1998	227	0	0			0	17	0	0	0	0	0	0	0	0	0	0			210	0	0
FLMW-202B	2/1/1998	57	38	19			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
FLMW-204A	2/1/1998	14	14	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
FLMW-204B	2/1/1998	68	33	35			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
FLMW-204B	4/15/1999	98	0	46			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
FLMW-204B	8/16/1999	85	43	42			0	0	0		0	0	0	0	0			0			0	0	
FLMW-205A	2/1/1998	144	0	36			0	98	0	0	0	0	0	0	0	10	0	0			0	0	0
FLMW-205B	2/1/1998	340	110	99			21	32	65	0	0	0	0	0	0	0	0	0			0	0	0
FLMW-205B	4/15/1999	285	110	67			17	16	64	0	0	0	0	0	0	0	0	0			0	0	0
FLMW-205B	8/20/1999	322	130	100			14	46	32		0	0	0	0	0			0			0	0	
FLMW-206A	2/1/1998	205	0	45			0	110	38	0	0	0	0	0	0	0	0	0			0	0	0
FLMW-206B	2/1/1998	199	47	34			18	23	49	0	0	0	0	0	0	0	0	0			0	0	0
FSGP-01 (60-61')	9/28/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
FSGP-01 (80-81')	9/28/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
FSGP-01 (91-92')	9/28/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
FSGP-02 (63-64')	9/29/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
FSGP-02 (79-80')	9/29/1998	12	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
FSGP-02 (91-92')	9/29/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
FSGP-03 (60-65')	9/1/1998	128	40	13			0	0	75	0	0	0	0	0	0	0	0	0			0	0	0
FSGP-04 (60-65')	9/3/1998	3,200	3,200	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
FSGP-10 (60-65')	8/24/1998	3,046	715	990	1,334	0	0		7		0				0	0	0		0	0			
FSGP-10 (78')	8/24/1998	518	426	73	0	0	0		19		0				0	0	0		0	0			
FSGP-10 (92')	8/24/1998	302	100	44	0	0	0		158		0				0	0	0		0	0			
FSGP-11 (63-64')	8/24/1998	149	38	46	16	0	6		31		0												
FSGP-11 (79-80')	8/24/1998	113	36	9	0	0	12		36		0												
FSGP-11 (93-94')	8/24/1998	128	35	2	0	0	20		39		0												
FSGP-12 (63-64')	8/24/1998	28	24	2	0	0	0		2		0												
FSGP-12 (79-80')	8/24/1998	34	29	2	0	0	0		3		0												
FSGP-12 (93-94')	8/24/1998	43	11	3	0	0	0		23		0												
FSGP-13 (63-64')	8/24/1998	232	36	80	101	0	0		16		0												

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

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N/A - Not applicable.

GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
FSGP-13 (80-81')	8/24/1998	50	22	7	0	0	0		9		0												
FSGP-13 (90-94')	8/24/1998	104	25	16	10	13	0		32		0												
FSGP-14 (63-64')	8/24/1998	361	62	66	230	0	0		2		0												
FSGP-14 (79-80')	8/24/1998	354	50	56	239	0	0		8		0												
FSGP-14 (93-94')	8/24/1998	129	35	30	61	0	0		3		0												
FSGP-15 (63-64')	8/24/1998	812	82	80	641	0	0		4		0												
FSGP-15 (77-78')	8/24/1998	626	86	72	463	0	0		4		0												
FSGP-15 (91-92')	8/24/1998	55	26	11	0	0	6		12		0												
FSGP-3 (60-65')	8/24/1998	39	10	7	0	0	0		22		0				0	0	0		0	0			
FSGP-3 (73-78')	8/24/1998	28	5	2	0	0	0		21		0				0	0	0		0	0			
FSGP-3 (92')	8/24/1998	3	2	0	0	0	0		1		0				0	0	0		0	0			
FSGP-4 (60-65')	8/24/1998	534	458	68	0	0	0		8		0				0	0	0		0	0			
FSGP-4 (78')	8/24/1998	133	87	3	0	0	0		43		0				0	0	0		0	0			
FSGP-4 (92')	8/24/1998	181	50	8	0	0	0		123		0				0	0	0		0	0			
FSGP-6 (53-58')	8/24/1998	6	6	0	0	0	0		0		0				0	0	0		0	0			
FSGP-6 (78')	8/24/1998	12	11	1	0	0	0		0		0				0	0	0		0	0			
FSGP-6 (92')	8/24/1998	6	6	0	0	0	0		0		0				0	0	0		0	0			
FSGP-7 (58-63')	8/24/1998	194	146	39	0	0	0		10		0				0	0	0		0	0			
FSGP-7 (78')	8/24/1998	106	98	7	0	0	0		0		0				0	0	0		0	0			
FSGP-7 (92')	8/24/1998	137	123	14	0	0	0		0		0				0	0	0		0	0			
FSGP-8 (60-65')	8/24/1998	1,467	855	606	0	0	0		6		0				0	0	0		0	0			
FSGP-8 (78')	8/24/1998	306	245	50	0	0	0		11		0				0	0	0		0	0			
FSGP-8 (92')	8/24/1998	671	371	279	0	0	0		21		0				0	0	0		0	0			
FSGP-9 (60-65')	8/24/1998	117	32	37	47	0	0		1		0				0	0	0		0	0			
FSGP-9 (78')	8/24/1998	17	14	3	0	0	0		0		0				0	0	0		0	0			
FSGP-9 (92')	8/24/1998	5	5	0	0	0	0		0		0				0	0	0		0	0			
FSHP-01 (115')	8/24/1998	1	1	0	0	0	0		0		0												
FSHP-01 (125')	8/24/1998	0	0	0	0	0	0		0		0												
FSHP-01 (50-60')	8/24/1998	9	3	0	0	0	0		6		0												
FSHP-01 (75')	8/24/1998	14	2	1	0	0	0		11		0												
FSHP-01 (85')	8/24/1998	1	1	0	0	0	0		0		0												
FSHP-01 (95')	8/24/1998	0	0	0	0	0	0		0		0												
FSHP-02 (100')	8/24/1998	116	116	0	0	0	0		0		0												
FSHP-02 (110')	8/24/1998	5	2	3	0	0	0		0		0												

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
FSHP-02 (120')	8/24/1998	13	10	1	0	0	0		2		0												
FSHP-02 (130')	8/24/1998	2	2	0	0	0	0		0		0												
FSHP-02 (55-65')	8/24/1998	1,098	1,020	78	0	0	0		0		0												
FSHP-02 (80')	8/24/1998	1,051	994	0	0	0	0		57		0												
FSHP-02 (90')	8/24/1998	411	52	0	0	0	0		359		0												
FSHP-03 (100')	8/24/1998	19	18	1	0	0	0		0		0												
FSHP-03 (110')	8/24/1998	14	14	0	0	0	0		0		0												
FSHP-03 (120')	8/24/1998	19	17	1	0	0	0		0		0												
FSHP-03 (130')	8/24/1998	13	13	0	0	0	0		0		0												
FSHP-03 (140')	8/24/1998	13	13	0	0	0	0		0		0												
FSHP-03 (150')	8/24/1998	11	10	1	0	0	0		0		0												
FSHP-03 (55-65')	8/24/1998	42	28	6	0	0	0		8		0												
FSHP-03 (80')	8/24/1998	25	21	2	0	0	0		2		0												
FSHP-03 (90')	8/24/1998	20	18	2	0	0	0		0		0												
FSHP-04 (100')	8/24/1998	103	44	27	7	0	0		25		0												
FSHP-04 (110')	8/24/1998	38	33	4	0	0	0		1		0												
FSHP-04 (120')	8/24/1998	16	14	2	0	0	0		1		0												
FSHP-04 (130')	8/24/1998	27	22	3	0	0	0		3		0												
FSHP-04 (140')	8/24/1998	13	12	1	0	0	0		1		0												
FSHP-04 (150')	8/24/1998	21	17	3	0	0	0		1		0												
FSHP-04 (55-65')	8/24/1998	473	92	98	274	6	0		3		0												
FSHP-04 (80')	8/24/1998	358	132	67	153	0	0		6		0												
FSHP-04 (90')	8/24/1998	79	33	3	0	0	8		35		0												
FSHP-5 (105')	8/24/1998	0	0	0	0	0	0		0		0												
FSHP-5 (115')	8/24/1998	1	1	0	0	0	0		0		0												
FSHP-5 (125')	8/24/1998	0	0	0	0	0	0		0		0												
FSHP-5 (135')	8/24/1998	1	1	0	0	0	0		0		0												
FSHP-5 (145')	8/24/1998	1	1	0	0	0	0		0		0												
FSHP-5 (50-60')	8/24/1998	3	3	0	0	0	0		0		0												
FSHP-5 (75')	8/24/1998	1	1	0	0	0	0		0		0												
FSHP-5 (85')	8/24/1998	11	11	0	0	0	0		0		0												
FSHP-5 (95')	8/24/1998	71	71	0	0	0	0		0		0												
FSHP-6 (100')	8/24/1998	105	97	7	0	0	0		0		0				0	0	0		0	0			
FSHP-6 (110')	8/24/1998	936	255	211	241	0	65		164		0				0	0	0		0	0			

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

R2-0001075

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
NYSDEC Class GA Standards (a)			5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
FSHP-6 (120')	8/24/1998	123	112	11	0	0	0		0		0				0	0	0		0	0			
FSHP-6 (130')	8/24/1998	151	129	19	0	0	0		3		0				0	0	0		0	0			
FSHP-6 (140')	8/24/1998	164	130	28	0	0	0		5		0				0	0	0		0	0			
FSHP-6 (150')	8/24/1998	133	113	16	0	0	0		4		0				0	0	0		0	0			
FSHP-6 (50-60')	8/24/1998	0	0	0	0	0	0		0		0				0	0	0		0	0			
FSHP-6 (70')	8/24/1998	0	0	0	0	0	0		0		0				0	0	0		0	0			
FSHP-6 (80')	8/24/1998	3	3	0	0	0	0		0		0				0	0	0		0	0			
FSHP-6 (90')	8/24/1998	13	13	0	0	0	0		0		0				0	0	0		0	0			
FSHP-7 (100')	8/24/1998	2	2	0	0	0	0		0		0				0	0	0		0	0			
FSHP-7 (110')	8/24/1998	1	1	0	0	0	0		0		0				0	0	0		0	0			
FSHP-7 (120')	8/24/1998	8	1	0	0	0	0		0		0				0	6	0		0	0			
FSHP-7 (130')	8/24/1998	2	1	2	0	0	0		0		0				0	0	0		0	0			
FSHP-7 (140')	8/24/1998	1	1	0	0	0	0		0		0				0	0	0		0	0			
FSHP-7 (150')	8/24/1998	1	1	0	0	0	0		0		0				0	0	0		0	0			
FSHP-7 (55-65')	8/24/1998	1	1	0	0	0	0		0		0				0	0	0		0	0			
FSHP-7 (80')	8/24/1998	0	0	0	0	0	0		0		0				0	0	0		0	0			
FSHP-7 (90')	8/24/1998	2	2	0	0	0	0		0		0				0	0	0		0	0			
FSMW-10A	9/9/1998	1,100	1,100	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
FSMW-10B	9/9/1998	58	58	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
FSMW-1A	9/2/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
FSMW-1B	9/2/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
FSMW-2A	9/1/1998	18,000	18,000	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
FSMW-2B	9/1/1998	50	50	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
FSMW-3A	9/3/1998	75	75	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
FSMW-3B	9/3/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
FSMW-4A	9/1/1998	120,000	120,000	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
FSMW-4B	9/2/1998	26	26	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
FSMW-5A	9/11/1998	22	22	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
FSMW-5B	9/10/1998	10	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
FSMW-6A	9/8/1998	13	13	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
FSMW-6B	9/8/1998	220	220	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
FSMW-7A	9/10/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
FSMW-7B	9/8/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
FSMW-8A	9/3/1998	44,000	44,000	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
FSMW-8B	9/3/1998	390	390	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
FSMW-9A	9/4/1998	29,355	26,680	1,249	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FSMW-9B	9/9/1998	100	100	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
G-401 (60)	10/8/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
G-401 (85)	10/8/1999	37	0	0			0	0	19	0	0	0	0	0	0	0	0	0			18	0	0
G-402 (55)	10/11/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
G-402 (85)	10/11/1999	157	15	0			32	0	110	0	0	0	0	0	0	0	0	0			0	0	0
G-409 (58)	10/13/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
G-409 (85)	10/13/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
G-451 (60)	10/12/1999	11	0	0			0	0	11	0	0	0	0	0	0	0	0	0			0	0	0
G-451 (85)	10/12/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
G-458 (60)	10/15/1999	71	22	0			0	0	0	0	0	0	0	0	0	0	0	0			11	0	0
G-458 (87)	10/15/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
GP-1 (65-)	1/1/1993	682	220	76	380	0	0		6		0		0		0	0	0		0	0			
GP-10 (65-)	1/1/1993	4,086	84	92	20	0	540		3,200		0		0		0	0	0		0	0			
GP-10 (75-)	1/1/1993	3,869	110	110	19	0	770		2,700		10		0		0	0	0		0	0			
GP-10 (85-)	1/1/1993	1,508	62	150	18	0	280		900		5		0		0	0	0		0	0			
GP-102 (63-65)	1/1/1994	96	10	7	2	0	10		48		0		0		0	0	0		0	0		0	
GP-102 (83-85)	1/1/1994	96	2	4	0	0	21		21		0		0		0	0	0		0	0		0	
GP-105 (63-65)	1/1/1994	458	42	160	250	0	0		6		0		0		0	0	0		0	0		0	
GP-105 (83-85)	1/1/1994	740	460	280	0	0	0		0		0		0		0	0	0		0	0		0	
GP-106 (63-65)	1/1/1994	443	58	180	200	0	0		5		0		0		0	0	0		0	0		0	
GP-106 (83-85)	1/1/1994	4,290	2,200	2,000	74	0	0		16		0		0		0	0	0		0	0		0	
GP-107 (83-85)	1/1/1994	4,426	180	180	12	0	1,100		2,800		14		0		0	0	0		0	0		0	
GP-107 (90-92)	1/1/1994	2,247	120	180	17	0	520		1,300		0		0		0	0	0		0	0		0	
GP-11 (65-)	1/1/1993	631	12	23	6	0	100		460		1		0		0	0	0		0	2			
GP-11 (75-)	1/1/1993	447	13	48	3	0	66		260		0		0		0	0	0		0	0			
GP-11 (85-)	1/1/1993	324	14	38	2	0	25		146		0		0		0	0	0		0	2			
GP-110 (63-65)	1/1/1994	474	80	12	14	0	46		300		0		0		0	0	0		0	0		0	
GP-113 (63-65)	1/1/1994	337	10	47	0	0	36		230		0		0		0	0	0		0	0		0	
GP-113 (83-85)	1/1/1994	423	18	44	0	0	70		270		0		0		0	0	0		0	0		0	
GP-114 (63-65)	1/1/1994	286	58	0	0	0	54		160		0		0		0	0	0		0	0		0	
GP-114 (83-85)	1/1/1994	75	0	47	0	0	0		28		0		0		0	0	0		0	0		0	
GP-115 (63-65)	1/1/1994	0	0	0	0	0	0		0		0		0		0	0	0		0	0		0	

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(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
GP-115 (83-85)	1/1/1994	0	0	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-116 (63-65)	1/1/1994	72	0	0	0	0	0		72		0		0		0	0	0		0	0		0	
GP-116 (83-85)	1/1/1994	50	0	0	0	0	0		50		0		0		0	0	0		0	0		0	
GP-117 (63-65)	1/1/1994	227	9	95	0	0	15		94		0		0		0	0	0		0	0		0	
GP-117 (65-)	1/1/1993	477	26	380	21	0	32		18		0		0		0	0	0		0	0			
GP-117 (73-75)	1/1/1994	477	26	380	21	0	32		18		0		0		0	0	0		0	0		0	
GP-12 (55-)	1/1/1993	237	9	31	3	0	32		100		0		0		0	0	0		0	0			
GP-12 (65-)	1/1/1993	2,435	62	440	0	3	520		1,200		0		0		0	0	0		0	0			
GP-12 (75-)	1/1/1993	4,848	140	1,100	130	5	990		2,100		3		0		0	0	0		0	0			
GP-120 (63-65)	1/1/1994	20	4	6	9	0	0		2		0		0		0	0	0		0	0		0	
GP-120 (83-85)	1/1/1994	7	0	0	0	0	0		7		0		0		0	0	0		0	0		0	
GP-121 (63-65)	1/1/1994	22	1	15	0	0	0		6		0		0		0	0	0		0	0		0	
GP-121 (83-85)	1/1/1994	1	0	0	0	0	0		1		0		0		0	0	0		0	0		0	
GP-122 (63-65)	1/1/1994	10	3	0	0	0	0		7		0		0		0	0	0		0	0		0	
GP-122 (83-85)	1/1/1994	0	0	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-124 (63-65)	1/1/1994	50	5	14	0	0	0		31		0		0		0	0	0		0	0		0	
GP-124 (83-85)	1/1/1994	114	16	27	1	0	22		45		0		0		0	0	0		0	0		0	
GP-125 (73-75)	10/31/1995	0	0	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-125 (90-92)	10/31/1995	17,000	17,000	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-126 (73-75)	11/1/1995	24,000	24,000	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-126 (93-95)	10/31/1995	21,000	21,000	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-127 (93-95)	11/1/1995	6	0	4	0	0	0		2		0		0		0	0	0		0	0		0	
GP-128 (60-62)	11/2/1995	7	7	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-128 (73-75)	11/2/1995	48	6	2	0	0	8		26		0		0		0	0	0		0	0		0	
GP-128 (93-95)	11/2/1995	6	0	0	0	0	0		5		0		0		0	0	0		0	0		0	
GP-129 (60-62)	11/3/1995	0	0	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-129 (75-77)	11/3/1995	2	2	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-13 (55-)	1/1/1993	61	45	9	3	0	0		3		0		0		0	0	0		0	0			
GP-13 (65-)	1/1/1993	2	2	0	0	0	0		0		0		0		0	0	0		0	0			
GP-13 (85-)	1/1/1993	20	8	2	0	0	2		2		0		0		0	0	0		0	0			
GP-130 (60-62)	11/6/1995	15	7	0	0	0	0		8		0		0		0	0	0		0	0		0	
GP-130 (73-75)	11/6/1995	18	0	0	0	0	0		12		0		0		0	0	0		0	0		0	
GP-130 (91-93)	11/6/1995	72	34	0	0	0	0		24		0		0		0	0	0		0	0		0	
GP-130 (SW) (0-0)	11/10/1995	0	0	0	0	0	0		0		0		0		0	0	0		0	0		0	

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
GP-131 (60-62)	11/3/1995	20,000	20,000	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-131 (73-75)	11/3/1995	50,000	50,000	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-131 (93-95)	11/3/1995	14,000	14,000	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-132 (60-62)	11/6/1995	230	0	0	0	0	0		230		0		0		0	0	0		0	0		0	
GP-132 (73-75)	11/7/1995	460	0	0	0	0	0		460		0		0		0	0	0		0	0		0	
GP-132 (93-95)	11/7/1995	24	8	4	0	0	3		10		0		0		0	0	0		0	0		0	
GP-133 (73-75)	11/6/1995	110	0	10	0	0	0		100		0		0		0	0	0		0	0		0	
GP-133 (93-95)	11/6/1995	16	16	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-134 (60-62)	11/7/1995	20,000	20,000	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-134 (73-75)	11/7/1995	2,200	2,200	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-134 (93-95)	11/7/1995	4,400	4,400	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-135 (73-75)	11/7/1995	37	23	0	0	0	0		14		0		0		0	0	0		0	0		0	
GP-135 (93-95)	11/7/1995	410	410	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-136 (60-62)	11/7/1995	2,600	2,200	0	0	0	0		400		0		0		0	0	0		0	0		0	
GP-136 (73-75)	11/7/1995	830	0	0	0	0	0		830		0		0		0	0	0		0	0		0	
GP-136 (93-95)	11/7/1995	670	670	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-137 (60-62)	11/8/1995	184	80	20	48	0	0		36		0		0		0	0	0		0	0		0	
GP-137 (73-75)	11/8/1995	191	24	0	32	0	16		95		0		0		0	0	0		0	0		0	
GP-137 (85-87)	11/8/1995	64	11	0	14	0	6		22		0		0		0	0	0		0	0		0	
GP-138 (60-62)	11/8/1995	253	160	27	32	0	0		34		0		0		0	0	0		0	0		0	
GP-138 (73-75)	11/8/1995	388	320	24	0	0	0		44		0		0		0	0	0		0	0		0	
GP-138 (88-90)	11/8/1995	55	23	0	0	0	12		20		0		0		0	0	0		0	0		0	
GP-139 (60-62)	11/8/1995	35	35	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-139 (73-75)	11/8/1995	15	15	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-139 (93-95)	11/8/1995	14	0	0	0	0	0		9		0		0		0	0	0		0	0		0	
GP-14 (55-)	1/1/1993	968	15	93	340	1	30		450		0		0		0	0	0		0	0			
GP-14 (65-)	1/1/1993	653	25	22	76	0	20		360		0		0		0	0	0		0	0			
GP-140 (60-62)	11/16/1995	70	0	6	0	0	5		59		0		0		0	0	0		0	0		0	
GP-140 (73-75)	11/16/1995	30	0	20	10	0	0		0		0		0		0	0	0		0	0		0	
GP-140 (93-95)	11/16/1995	0	0	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-141 (60-62)	11/9/1995	12,000	12,000	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-141 (73-75)	11/9/1995	16,200	14,000	1,100	1,100	0	0		0		0		0		0	0	0		0	0		0	
GP-141 (93-95)	11/9/1995	22,000	22,000	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-142 (61-63)	11/9/1995	0	0	0	0	0	0		0		0		0		0	0	0		0	0		0	

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N/A - Not applicable.

GV - Guidance Value

Table 5.2
New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
GP-143 (64-66)	11/9/1995	15	6	0	0	0	0		9		0		0		0	0	0		0	0		0	
GP-144 (60-62)	11/10/1995	61	49	0	0	0	0		12		0		0		0	0	0		0	0		0	
GP-144 (73-75)	11/10/1995	76	48	13	0	0	0		15		0		0		0	0	0		0	0		0	
GP-144 (93-95)	11/10/1995	0	0	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-145 (60-62)	11/10/1995	22,500	20,000	1,200	1,300	0	0		0		0		0		0	0	0		0	0		0	
GP-145 (73-75)	11/10/1995	40,200	37,000	2,200	1,000	0	0		0		0		0		0	0	0		0	0		0	
GP-145 (92-94)	11/10/1995	3,200	3,200	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-146 (60-62)	11/10/1995	300	130	0	0	0	0		170		0		0		0	0	0		0	0		0	
GP-146 (73-75)	11/10/1995	130	130	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-146 (93-95)	11/10/1995	85	59	15	0	0	0		11		0		0		0	0	0		0	0		0	
GP-147 (60-62)	11/13/1995	350	0	0	0	0	0		210		0		0		0	0	0		0	0		0	
GP-147 (73-75)	11/13/1995	134	25	25	0	0	14		63		0		0		0	0	0		0	0		0	
GP-147 (86-88)	11/13/1995	800	200	160	0	0	100		340		0		0		0	0	0		0	0		0	
GP-148 (60-62)	11/13/1995	35	14	0	0	0	0		21		0		0		0	0	0		0	0		0	
GP-148 (67-69)	11/13/1995	30	0	0	0	0	0		18		0		0		0	0	0		0	0		0	
GP-149 (60-62)	11/13/1995	200	34	48	0	0	18		100		0		0		0	0	0		0	0		0	
GP-149 (70-72)	11/13/1995	289	40	150	14	0	23		62		0		0		0	0	0		0	0		0	
GP-15 (65-)	1/1/1993	789	89	470	44	0	66		93		0		0		0	0	0		0	0			
GP-15 (75-)	1/1/1993	2,173	150	1,500	72	2	290		140		4		0		0	0	0		0	0			
GP-15 (85-)	1/1/1993	33	11	10	0	0	4		8		0		0		0	0	0		0	0			
GP-150 (60-62)	11/14/1995	660	0	490	170	0	0		0		0		0		0	0	0		0	0		0	
GP-150 (73-75)	11/14/1995	1,130	0	990	140	0	0		0		0		0		0	0	0		0	0		0	
GP-150 (78-81)	11/14/1995	4,080	0	3,700	380	0	0		0		0		0		0	0	0		0	0		0	
GP-151 (60-62)	11/14/1995	36	0	36	0	0	0		0		0		0		0	0	0		0	0		0	
GP-151 (67-69)	11/14/1995	125	52	38	0	0	15		20		0		0		0	0	0		0	0		0	
GP-152 (60-62)	11/15/1995	12	0	0	0	0	0		6		0		0		0	0	0		0	0		0	
GP-152 (73-75)	11/15/1995	28	0	10	0	0	0		18		0		0		0	0	0		0	0		0	
GP-152 (93-95)	11/15/1995	85	20	23	0	0	0		31		0		0		0	0	0		0	0		0	
GP-157 (60-62)	11/16/1995	320	320	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-157 (73-75)	11/16/1995	1,100	1,100	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-157 (93-95)	11/16/1995	29	29	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-158 (60-62)	11/17/1995	69	20	36	13	0	0		0		0		0		0	0	0		0	0		0	
GP-158 (93-95)	11/17/1995	0	0	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-159 (60-62)	11/17/1995	185	130	43	0	0	0		12		0		0		0	0	0		0	0		0	

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N/A - Not applicable.
GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
GP-159 (73-75)	11/17/1995	62	50	0	0	0	0		12		0		0		0	0	0		0	0		0	
GP-159 (93-95)	11/17/1995	60	19	23	12	0	0		6		0		0		0	0	0		0	0		0	
GP-16 (65-)	1/1/1993	15	1	14	0	0	0		0		0		0		0	0	0		0	0			
GP-16 (75-)	1/1/1993	89	4	35	3	0	0		1		0		0		0	35	0		2	3			
GP-16 (85-)	1/1/1993	86	0	86	0	0	0		0		0		0		0	0	0		0	0			
GP-160 (60-62)	11/17/1995	97	97	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-160 (73-75)	11/17/1995	190	190	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-160 (93-95)	11/17/1995	150	150	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-161 (60-62)	11/27/1995	510	0	140	370	0	0		0		0		0		0	0	0		0	0		0	
GP-161 (73-75)	11/27/1995	238	0	110	100	0	0		0		0		0		0	0	0		0	0		0	
GP-161 (93-95)	11/27/1995	120	33	52	35	0	0		0		0		0		0	0	0		0	0		0	
GP-162 (60-62)	11/27/1995	730	0	190	540	0	0		0		0		0		0	0	0		0	0		0	
GP-162 (73-75)	11/27/1995	116	64	27	25	0	0		0		0		0		0	0	0		0	0		0	
GP-162 (93-95)	11/27/1995	380	140	100	140	0	0		0		0		0		0	0	0		0	0		0	
GP-162D (60-62)	11/28/1995	44	22	22	0	0	0		0		0		0		0	0	0		0	0		0	
GP-162D (73-75)	11/28/1995	249	150	89	0	0	0		10		0		0		0	0	0		0	0		0	
GP-162D (93-95)	11/28/1995	1,280	840	440	0	0	0		0		0		0		0	0	0		0	0		0	
GP-163 (60-62)	11/27/1995	0	0	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-163 (73-75)	11/27/1995	5	5	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-164 (60-62)	11/27/1995	154	0	14	140	0	0		0		0		0		0	0	0		0	0		0	
GP-164 (73-75)	11/27/1995	215	0	0	180	0	0		0		0		25		10	0	0		0	0		0	
GP-164 (93-95)	11/27/1995	140	0	0	130	0	0		0		0		10		0	0	0		0	0		0	
GP-165 (60-62)	11/27/1995	970	0	0	970	0	0		0		0		0		0	0	0		0	0		0	
GP-165 (73-75)	11/27/1995	1,100	0	0	1,100	0	0		0		0		0		0	0	0		0	0		0	
GP-165 (93-95)	11/27/1995	1,520	0	120	1,400	0	0		0		0		0		0	0	0		0	0		0	
GP-166 (58-60)	11/27/1995	28	28	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-166 (73-75)	11/27/1995	250	230	20	0	0	0		0		0		0		0	0	0		0	0		0	
GP-166 (93-95)	11/27/1995	200	170	30	0	0	0		0		0		0		0	0	0		0	0		0	
GP-167 (60-62)	11/28/1995	820	300	240	280	0	0		0		0		0		0	0	0		0	0		0	
GP-167 (73-75)	11/28/1995	3,560	3,000	560	0	0	0		0		0		0		0	0	0		0	0		0	
GP-167 (93-95)	11/28/1995	4,160	3,000	820	0	0	0		340		0		0		0	0	0		0	0		0	
GP-17 (65-)	1/1/1993	114	77	4	20	0	2		2		0		0		0	5	0		0	0			
GP-17 (75-)	1/1/1993	105	54	5	23	0	3		10		0		0		0	0	0		0	0			
GP-171 (60-62)	11/28/1995	0	0	0	0	0	0		0		0		0		0	0	0		0	0		0	

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GV - Guidance Value

Table 5.2
New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
GP-171 (73-75)	11/28/1995	160	160	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-171 (93-95)	11/28/1995	258	190	54	0	0	0		14		0		0		0	0	0		0	0		0	
GP-173 (60-62)	11/28/1995	1,240	0	0	0	0	280		780		0		0		0	0	0		0	0		0	
GP-173 (70-72)	11/28/1995	2,470	180	1,900	120	0	270		0		0		0		0	0	0		0	0		0	
GP-174 (60-62)	11/29/1995	365	320	11	0	0	0		34		0		0		0	0	0		0	0		0	
GP-174 (73-75)	11/29/1995	234	180	14	0	0	0		40		0		0		0	0	0		0	0		0	
GP-174 (93-95)	11/29/1995	220	220	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-175 (60-62)	11/29/1995	22	0	0	0	0	0		22		0		0		0	0	0		0	0		0	
GP-175 (73-75)	11/29/1995	110	0	5	0	0	14		91		0		0		0	0	0		0	0		0	
GP-176 (60-62)	11/29/1995	133	70	30	0	0	0		33		0		0		0	0	0		0	0		0	
GP-176 (73-75)	11/29/1995	46	17	11	0	0	0		12		0		0		0	0	0		6	0		0	
GP-176 (93-95)	11/29/1995	30	24	0	0	0	0		0		0		0		0	0	0		6	0		0	
GP-178 (93-95)	11/29/1995	207	170	28	9	0	0		0		0		0		0	0	0		0	0		0	
GP-178R (73-75)	11/30/1995	1,950	1,800	150	0	0	0		0		0		0		0	0	0		0	0		0	
GP-178R (93-95)	11/30/1995	520	520	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-179 (73-75)	11/30/1995	0	0	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-179 (93-95)	11/30/1995	0	0	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-18 (65-)	1/1/1993	92	92	0	0	0	0		0		0		0		0	0	0		0	0			
GP-18 (75-)	1/1/1993	22	20	0	0	0	0		2		0		0		0	0	0		0	0			
GP-18 (85-)	1/1/1993	5	0	0	0	0	0		5		0		0		0	0	0		0	0			
GP-180 (60-62)	11/30/1995	2,800	2,800	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-180 (73-75)	11/30/1995	12,900	11,000	0	1,900	0	0		0		0		0		0	0	0		0	0		0	
GP-180 (93-95)	11/30/1995	14,800	12,000	1,200	1,600	0	0		0		0		0		0	0	0		0	0		0	
GP-181 (73-75)	12/1/1995	278	200	18	17	0	0		43		0		0		0	0	0		0	0		0	
GP-181 (82-84)	12/1/1995	50	36	0	0	0	0		14		0		0		0	0	0		0	0		0	
GP-182 (60-62)	12/1/1995	191	15	36	140	0	0		0		0		0		0	0	0		0	0		0	
GP-182 (73-75)	12/1/1995	96	74	22	0	0	0		0		0		0		0	0	0		0	0		0	
GP-182 (93-95)	12/1/1995	730	490	240	0	0	0		0		0		0		0	0	0		0	0		0	
GP-183 (73-75)	12/4/1995	79	74	0	0	0	0		5		0		0		0	0	0		0	0		0	
GP-183 (93-95)	12/4/1995	11	11	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-184 (60-62)	12/4/1995	1,600	1,500	100	0	0	0		0		0		0		0	0	0		0	0		0	
GP-184 (73-75)	12/4/1995	210	0	0	0	0	0		210		0		0		0	0	0		0	0		0	
GP-184 (93-95)	12/4/1995	0	0	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-185 (63-65)	12/4/1995	7	7	0	0	0	0		0		0		0		0	0	0		0	0		0	

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
GP-185 (73-75)	12/4/1995	32	32	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-185 (93-95)	12/4/1995	56	56	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-186 (60-62)	12/5/1995	1,800	1,800	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-186 (73-75)	12/5/1995	0	0	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-186 (93-95)	12/5/1995	0	0	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-187 (60-62)	12/5/1995	120	120	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-187 (73-75)	12/5/1995	0	0	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-187 (85-87)	12/5/1995	0	0	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-188 (60-62)	12/5/1995	1,300	1,300	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-188 (72-74)	12/5/1995	156	150	6	0	0	0		0		0		0		0	0	0		0	0		0	
GP-189 (63-65)	1/1/1996	468	400	38	30	0	0	0	0				0		0	0	0		0	0		0	
GP-19 (65-)	1/1/1993	58	53	0	3	0	0		2		0		0		0	0	0		0	0			
GP-19 (75-)	1/1/1993	36	29	2	3	0	0		3		0		0		0	0	0		0	0			
GP-19 (85-)	1/1/1993	55	40	8	5	0	0		2		0		0		0	0	0		0	0			
GP-190 (60-62)	1/1/1996	14,000	14,000	0	0	0	0	0	0				0		0	0	0		0	0		0	
GP-191 (60-62)	1/1/1996	330	0	160	170	0	0	0	0				0		0	0	0		0	0		0	
GP-192 (60-62)	1/1/1996	387	67	110	210	0	0	0	0				0		0	0	0		0	0		0	
GP-193 (60-62)	1/1/1996	676	0	11	310	0	0	0	0				340		15	0	0		0	0		0	
GP-194 (60-62)	1/1/1996	2,190	0	490	1,700	0	0	0	0				0		0	0	0		0	0		0	
GP-195 (60-62)	1/1/1996	946	0	0	250	0	0	0	0				450		59	66	65		15	13		0	
GP-196 (60-62)	1/1/1996	8	8	0	0	0	0	0	0				0		0	0	0		0	0		0	
GP-197 (60-62)	1/1/1996	160	160	0	0	0	0	0	0				0		0	0	0		0	0		0	
GP-2 (65-)	1/1/1993	0	0	0	0	0	0		0		0		0		0	0	0		0	0			
GP-20 (65-)	1/1/1993	285	55	220	7	0	0		3		0		0		0	0	0		0	0			
GP-20 (75-)	1/1/1993	419	49	330	35	0	0		5		0		0		0	0	0		0	0			
GP-20 (85-)	1/1/1993	2,164	150	2,000	10	0	0		3		0		0		0	0	0		0	1			
GP-202 (60-62)	1/1/1996	242	200	27	0	0	0	0	15				0		0	0	0		0	0		0	
GP-203 (60-62)	1/1/1996	40	0	0	40	0	0	0	0				0		0	0	0		0	0		0	
GP-204 (62-62)	1/1/1996	0	0	0	0	0	0	0	0				0		0	0	0		0	0		0	
GP-205 (60-62)	1/1/1996	73	28	0	0	0	0	0	45				0		0	0	0		0	0		0	
GP-206 (60-62)	1/1/1996	281	20	42	0	0	51	0	140				0		0	0	0		0	0		0	
GP-207 (60-62)	1/1/1996	28	2	6	0	0	4	0	12				0		0	0	0		0	0		0	
GP-208 (60-62)	1/1/1996	72	13	0	5	0	11	0	43				0		0	0	0		0	0		0	
GP-209 (60-62)	1/1/1996	0	0	0	0	0	0	0	0				0		0	0	0		0	0		0	

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

R2-0001083

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
GP-21 (65-)	1/1/1993	0	0	0	0	0	0		0		0		0		0	0	0		0	0			
GP-21 (75-)	1/1/1993	6	6	0	0	0	0		0		0		0		0	0	0		0	0			
GP-21 (85-)	1/1/1993	1	1	0	0	0	0		0		0		0		0	0	0		0	0			
GP-21-GW01	10/1/1999	9	0	0	4	0	0		0	0	0	0		0	0	2	0		1	2		0	
GP-210 (60-62)	1/1/1996	695	55	49	24	0	67	0	460				0		0	0	0		0	0		0	
GP-211 (60-62)	1/1/1996	4	0	0	0	0	0	0	4				0		0	0	0		0	0		0	
GP-212 (60-62)	1/1/1996	180	180	0	0	0	0	0	0				0		0	0	0		0	0		0	
GP-219 (60-62)	1/1/1996	0	0	0	0	0	0	0	0				0		0	0	0		0	0		0	
GP-22 (65-)	1/1/1993	156	50	11	13	0	0		0		0		0		0	11	4		23	44			
GP-22 (75-)	1/1/1993	892	530	130	20	0	0		0		0		0		0	32	0		60	120			
GP-22 (85-)	1/1/1993	296	46	17	11	0	0		0		0		0		0	35	9		58	120			
GP-22-GW01	10/1/1999	1	0	0	0	0	0		0	0	0	0		0	0	0	0		0	1		0	
GP-220 (60-62)	1/1/1996	0	0	0	0	0	0	0	0				0		0	0	0		0	0		0	
GP-221 (60-62)	1/1/1996	70	0	0	0	0	17	0	53				0		0	0	0		0	0		0	
GP-222 (60-62)	1/1/1996	700	0	170	0	0	110	0	420				0		0	0	0		0	0		0	
GP-223 (60-62)	1/1/1996	0	0	0	0	0	0	0	0				0		0	0	0		0	0		0	
GP-224 (60-62)	1/1/1996	182	25	54	14	0	0	0	89				0		0	0	0		0	0		0	
GP-225 (60-62)	1/1/1996	970	970	0	0	0	0	0	0				0		0	0	0		0	0		0	
GP-226 (60-62)	1/1/1996	1,600	1,600	0	0	0	0	0	0				0		0	0	0		0	0		0	
GP-228 (60-62)	1/1/1996	111	77	23	0	0	0	0	11				0		0	0	0		0	0		0	
GP-229 (60-62)	1/1/1996	13	8	6	0	0	0	0	0				0		0	0	0		0	0		0	
GP-23 (65-)	1/1/1993	676	280	240	5	0	21		130		0		0		0	0	0		0	0			
GP-23 (75-)	1/1/1993	202	74	35	0	0	13		80		0		0		0	0	0		0	0			
GP-23 (85-)	1/1/1993	75	21	49	1	0	0		4		0		0		0	0	0		0	0			
GP-23-GW01	10/1/1999	0	0	0	0	0	0		0	0	0	0		0	0	0	0		0	0		0	
GP-230 (60-62)	1/1/1996	464	34	170	260	0	0	0	0				0		0	0	0		0	0		0	
GP-231 (60-62)	1/1/1996	0	0	0	0	0	0	0	0				0		0	0	0		0	0		0	
GP-232 (60-62)	1/1/1996	37	37	0	0	0	0	0	0				0		0	0	0		0	0		0	
GP-233 (60-62)	1/1/1996	1,100	1,100	0	0	0	0	0	0				0		0	0	0		0	0		0	
GP-234 (60-62)	1/1/1996	126	0	7	0	0	9	0	110				0		0	0	0		0	0		0	
GP-235 (60-62)	1/1/1996	0	0	0	0	0	0	0	0				0		0	0	0		0	0		0	
GP-237 (60-62)	1/1/1996	340	340	0	0	0	0	0	0				0		0	0	0		0	0		0	
GP-238 (60-62)	1/1/1996	1,330	0	330	1,000	0	0	0	0				0		0	0	0		0	0		0	
GP-24 (65-)	1/1/1993	2,739	2	170	2,300	8	0		0		0		200		19	0	0		31	2			

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

R2-0001084

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
GP-24 (75-)	1/1/1993	2,261	0	31	1,800	0	0		0		0		430		0	0	0		0	0			
GP-24 (85-)	1/1/1993	1,700	0	0	700	0	0		0		0		1,000		0	0	0		0	0			
GP-24-GW01	10/1/1999	0	0	0	0	0	0		0	0	0	0		0	0	0	0		0	0		0	
GP-241 (60-62)	1/1/1996	10	10	0	0	0	0	0	0				0		0	0	0		0	0		0	
GP-242 (60-62)	1/1/1996	86	64	13	9	0	0	0	0				0		0	0	0		0	0		0	
GP-243 (60-62)	1/1/1996	200	48	61	91	0	0	0	0				0		0	0	0		0	0		0	
GP-244 (60-62)	1/1/1996	17	0	5	0	0	0	0	12				0		0	0	0		0	0		0	
GP-248 (60-62)	1/1/1996	6,210	0	1,800	0	0	510	0	3,900				0		0	0	0		0	0		0	
GP-25 (65-)	1/1/1993	59	31	28	0	0	0		0		0		0		0	0	0		0	0			
GP-25 (75-)	1/1/1993	0	0	0	0	0	0		0		0		0		0	0	0		0	0			
GP-25 (85-)	1/1/1993	0	0	0	0	0	0		0		0		0		0	0	0		0	0			
GP-25-GW01	10/1/1999	1	1	0	0	0	0		0	0	0	0		0	0	0	0		0	0		0	
GP-251 (60-62)	1/1/1996	4	2	0	0	0	0	0	3				0		0	0	0		0	0		0	
GP-252 (60-62)	1/1/1996	217	200	17	0	0	0	0	0				0		0	0	0		0	0		0	
GP-253 (60-62)	1/1/1996	10	10	0	0	0	0	0	0				0		0	0	0		0	0		0	
GP-255 (60-62)	1/1/1996	21	21	0	0	0	0	0	0				0		0	0	0		0	0		0	
GP-256 (60-64')	9/2/1997	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GP-256 (72-76')	9/2/1997	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GP-256 (92-96')	9/2/1997	155	150	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GP-257 (60-64')	9/2/1997	5	2	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GP-257 (72-76')	9/2/1997	15	7	2	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GP-257 (92-96')	9/2/1997	125	90	9	13	0	2	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GP-258 (60-64')	9/3/1997	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GP-258 (68-72)	9/3/1997	11	0	1	0		0		6		0	0	0			0							
GP-258 (72-76')	9/3/1997	12	1	6	0	0	1	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GP-259 (60-64')	9/3/1997	18	4	5	2	0	1	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GP-259 (72-76')	9/3/1997	32	12	7	4	0	1	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GP-259 (92-96')	9/3/1997	182	84	36	45	0	4	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GP-26 (65-)	1/1/1993	13	9	4	0	0	0		0		0		0		0	0	0		0	0			
GP-26 (75-)	1/1/1993	3	3	0	0	0	0		0		0		0		0	0	0		0	0			
GP-26 (85-)	1/1/1993	2	2	0	0	0	0		0		0		0		0	0	0		0	0			
GP-26-GW01	10/1/1999	56	0	0	7	0	0		0	0	0	0		0	3	2	24		7	11		0	
GP-260 (60-64')	9/4/1997	16	1	1	5	0	1	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GP-260 (72-76')	9/4/1997	136	21	19	37	0	14	0	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
GP-260 (92-96')	9/4/1997	1,223	180	200	170	0	180	0	450	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GP-261 (60-64')	9/4/1997	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GP-261 (72-76')	9/4/1997	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
GP-261 (92-96')	9/4/1997	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GP-262 (60-64')	9/4/1997	22	18	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GP-262 (72-76')	9/4/1997	736	590	140	0	0	2	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GP-262 (92-96')	9/4/1997	427	340	83	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GP-263 (60-64)	9/5/1997	2	0	0	0		0		2		0	0	0			0						0	
GP-263 (72-76)	9/5/1997	12	1	0	0		1		9		0	0	0			1						0	
GP-263 (92-96)	9/5/1997	82	9	5	8		8		52		0	0	0			0						0	
GP-264 (60-64)	9/29/1997	0	0	0	0		0		0		0	0	0			0						0	
GP-264 (72-76)	9/29/1997	0	0	0	0		0		0		0	0	0			0						0	
GP-264 (92-96)	9/29/1997	0	0	0	0		0		0		0	0	0			0						0	
GP-265 (64-68)	9/29/1997	0	0	0	0		0		0		0	0	0			0						0	
GP-27 (55-)	1/1/1993	33	14	13	2	0	0		4		0		0		0	0	0		0	0			
GP-27 (65-)	1/1/1993	53	29	19	1	0	0		4		0		0		0	0	0		0	0			
GP-27 (85-)	1/1/1993	65	28	26	6	0	0		5		0		0		0	0	0		0	0			
GP-27-GW01	10/1/1999	390	0	0	31	0	0		0	0	0	0		0	3	91	81		75	98		0	
GP-28 (65-)	1/1/1993	1	0	0	0	0	0		0		0		0		0	0	0		0	1			
GP-28-GW01	10/1/1999	0	0	0	0	0	0		0	0	0	0		0	0	0	0		0	0		0	
GP-29 (65-)	1/1/1993	0	0	0	0	0	0		0		0		0		0	0	0		0	0			
GP-29 (75-)	1/1/1993	17	0	0	0	0	0		6		0		0		0	0	0		0	0			
GP-29-GW01	10/1/1999	56	0	6	19	0	0		0	0	0	0		0	0	11	3		6	10		2	
GP-3 (55-)	1/1/1993	108	0	79	7	2	14		7		0		0		0	0	0		0	0			
GP-3 (65-)	1/1/1993	21	1	16	0	0	0		4		0		0		0	0	0		0	0			
GP-30 (65-)	1/1/1993	2,700	0	0	0	0	0		2,300		0		0		0	0	0		0	0			
GP-30 (75-)	1/1/1993	2,270	0	0	0	0	0		970		0		0		0	0	0		0	0			
GP-30 (85-)	1/1/1993	421	25	3	9	0	14		150		0		0		0	0	0		0	0			
GP-30-GW01	10/1/1999	633	1	2	46	0	0		0	0	0	0		0	5	96	130		150	160		6	
GP-301 (55)	12/2/1998	204	0	0			0	0	0	0	0	0		0	0	0	0	0			150	0	0
GP-301 (65)	12/2/1998	184	0	0			0	0	0	0	0	0		0	0	0	0	0			140	0	0
GP-302 (55)	12/3/1998	248	0	0			0	0	0	0	0	0		0	0	0	0	0			200	0	0
GP-303 (55)	12/4/1998	102	0	0			0	0	12	0	0	0		0	0	0	0	0			70	0	0
GP-303 (65)	12/4/1998	460	0	0			17	0	100	0	0	0		0	0	0	0	0			180	0	0

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

Table 5.2
New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
NYSDEC Class GA Standards (a)			5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
GP-304 (55)	12/10/1998	1,028	0	0			68	0	870	0	0	0		0	0	0	0	0			0	0	0
GP-304 (65)	12/10/1998	2,565	25	260			280	0	1,700	0	0	0		0	0	0	0	0			0	0	0
GP-305 (55)	12/4/1998	2,750	0	110			280	0	1,800	0	0	0		0	0	0	0	0			0	0	0
GP-306 (55)	12/7/1998	255	0	0			0	0	190	0	0	0		0	0	0	0	0			39	12	0
GP-31 (65-)	1/1/1993	325	300	10	0	0	0		15		0		0		0	0	0		0	0			
GP-31 (75-)	1/1/1993	165	140	13	0	0	0		12		0		0		0	0	0		0	0			
GP-31 (85-)	1/1/1993	84	21	48	0	0	0		15		0		0		0	0	0		0	0			
GP-31-GW01	10/1/1999	61	0	5	41	0	0		0	0	0	0		0	2	0	0		4	2		7	
GP-310 (55)	12/14/1998	41	0	0			0	0	15	0	0	0		0	0	0	0	0			26	0	0
GP-312 (65)	12/11/1998	102	0	0			0	0	0	0	0	0		0	0	0	0	0			80	0	0
GP-313 (55)	1/25/1999	31	0	0			0	0	0	0	0	0		0	0	31	0	0			0	0	0
GP-315 (55)	1/28/1999	14	14	0			0	0	0	0	0	0		0	0	0	0	0			0	0	0
GP-315 (65)	1/28/1999	421	370	51			0	0	0	0	0	0		0	0	0	0	0			0	0	0
GP-316 (55)	1/28/1999	38	0	15			0	12	0	0	0	0		0	0	0	0	0			11	0	0
GP-317 (55)	1/27/1999	55	0	0			0	12	0	0	0	0		0	0	0	0	0			29	0	0
GP-317 (65)	1/27/1999	11	0	0			0	0	0	0	0	0		0	0	0	0	0			11	0	0
GP-319 (55)	12/15/1998	215	26	56			0	110	0	0	0	0		0	0	0	0	0			23	0	0
GP-319 (65)	12/15/1998	226	88	51			0	76	0	0	0	0		0	0	0	0	0			11	0	0
GP-32 (65-)	1/1/1993	2,546	2,200	46	48	0	0		220		0		0		0	0	0		0	0			
GP-32 (75-)	1/1/1993	3,453	2,500	13	0	0	0		830		0		0		0	0	0		0	0			
GP-32 (85-)	1/1/1993	8,014	5,300	32	5	0	190		2,300		8		0		0	0	0		0	0			
GP-32-GW01	10/1/1999	679	2	97	562	0	0		8	0	0	0		0	0	0	0		0	0		7	
GP-320 (55)	12/10/1998	486	0	76			0	410	0	0	0	0		0	0	0	0	0			0	0	0
GP-320 (65)	12/10/1998	620	0	130			0	490	0	0	0	0		0	0	0	0	0			0	0	0
GP-321 (55)	1/18/1999	10	0	0			0	0	0	0	0	0		0	0	0	0	0			0	0	0
GP-324 (55)	1/26/1999	166	0	11			0	42	0	0	0	0		0	0	0	0	0			83	0	0
GP-324 (65)	1/26/1999	103	0	17			0	44	0	0	0	0		0	0	0	0	0			30	0	0
GP-325 (55)	1/26/1999	200	0	0			0	180	0	0	0	0		0	0	0	0	0			20	0	0
GP-33 (65-)	1/1/1993	4	4	0	0	0	0		0		0		0		0	0	0		0	0			
GP-33 (75-)	1/1/1993	4	4	0	0	0	0		0		0		0		0	0	0		0	0			
GP-33 (85-)	1/1/1993	0	0	0	0	0	0		0		0		0		0	0	0		0	0			
GP-33-GW01	10/1/1999	123	0	17	96	0	0		1	0	0	0		0	1	0	0		0	0		7	
GP-34 (75-)	1/1/1993	77	4	0	0	0	0		0		0		0		8	0	6		44	15			
GP-34 (85-)	1/1/1993	3	2	0	0	0	0		0		0		0		0	0	0		1	0			

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.
(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
N/A - Not applicable.
GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
GP-34-GW01	10/1/1999	984	2	5	30	9	0		24	0	0	0		0	220	190	97		120	220		9	
GP-35 (55-)	1/1/1993	70	7	7	4	0	6		41		0		0		0	0	0		0	0			
GP-35 (65-)	1/1/1993	129	19	20	6	0	10		67		0		0		0	0	0		0	0			
GP-35-GW01	10/1/1999	218	0	0	4	0	0		0	0	0	0		0	8	41	64		51	40		0	
GP-36 (65-)	1/1/1993	17	0	8	3	0	0		6		0		0		0	0	0		0	0			
GP-36 (75-)	1/1/1993	21	0	8	0	0	0		13		0		0		0	0	0		0	0			
GP-36 (85-)	1/1/1993	3	2	0	0	0	0		1		0		0		0	0	0		0	0			
GP-36-GW01	10/1/1999	11	0	0	0	0	0		0	0	0	0		0	0	1	0		0	1		8	
GP-37 (65-)	1/1/1993	15	4	6	2	0	0		0		0		0		3	0	0		0	0			
GP-37 (75-)	1/1/1993	15	0	2	6	0	0		0		0		0		6	0	0		0	0			
GP-37 (85-)	1/1/1993	4	1	0	1	0	0		0		0		0		0	0	0		0	0			
GP-37-GW01	10/1/1999	8	0	0	0	0	0		0	0	0	0		0	0	0	0		0	0		8	
GP-38 (55-)	1/1/1993	48	8	6	3	0	0		26		0		0		0	0	0		0	0			
GP-38 (65-)	1/1/1993	349	65	43	26	0	22		160		0		0		0	0	0		0	0			
GP-38 (75-)	1/1/1993	262	21	33	24	0	15		140		0		0		0	0	0		0	0			
GP-39 (55-)	1/1/1993	147	42	22	33	0	0		37		0		0		0	0	0		0	0			
GP-39 (65-)	1/1/1993	253	85	32	39	0	8		69		0		0		0	0	0		0	0			
GP-4 (55-)	1/1/1993	115	3	3	0	0	0		100		2		0		0	0	0		0	0			
GP-4 (65-)	1/1/1993	196	2	140	3	0	0		50		0		0		0	0	0		0	0			
GP-4 (85-)	1/1/1993	28	7	4	0	0	0		9		0		0		0	0	0		0	0			
GP-41 (55-)	1/1/1993	2	0	0	0	0	0		2		0		0		0	0	0		0	0			
GP-41 (65-)	1/1/1993	2	0	0	0	0	0		2		0		0		0	0	0		0	0			
GP-41 (75-)	1/1/1993	3	0	0	0	0	0		3		0		0		0	0	0		0	0			
GP-42 (65-)	1/1/1993	4	0	0	0	0	0		3		0		0		0	0	0		0	0			
GP-42 (75-)	1/1/1993	0	0	0	0	0	0		0		0		0		0	0	0		0	0			
GP-43 (65-)	1/1/1993	0	0	0	0	0	0		0		0		0		0	0	0		0	0			
GP-43 (65-67)	1/1/1994	0	0	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-43 (83-85)	1/1/1994	0	0	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-44 (63-65)	1/1/1994	61	10	7	5	0	10		22		0		0		0	0	0		0	0		0	
GP-44 (83-85)	1/1/1994	68	14	10	5	0	15		17		0		0		0	0	0		0	0		0	
GP-45 (63-65)	1/1/1994	27	3	4	2	0	4		8		0		0		0	0	0		0	0		0	
GP-45 (83-85)	1/1/1994	45	14	6	2	0	4		11		0		0		0	0	0		0	0		0	
GP-5 (55-)	1/1/1993	3	1	0	0	0	1		0		0		0		0	0	0		0	0			
GP-5 (65-)	1/1/1993	6	2	0	0	0	1		1		0		0		0	0	0		0	0			

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
GP-5 (75-)	1/1/1993	90	34	7	5	0	9		26		0		0		0	0	0		0	2			
GP-50 (63-65)	1/1/1994	27	1	8	1	0	8		6		0		0		0	0	0		0	0		0	
GP-50 (83-85)	1/1/1994	27	4	14	1	0	3		3		0		0		0	0	0		0	0		0	
GP-51 (63-65)	1/1/1994	2,701	130	2,200	73	0	160		120		0		0		0	0	0		0	0		0	
GP-51 (78-80)	1/1/1994	3,046	100	2,600	86	1	160		72		6		0		0	0	0		0	0		0	
GP-53 (63-65)	1/1/1994	64	15	0	0	0	0		37		0		0		0	0	0		0	0		0	
GP-53 (76-78)	1/1/1994	84	25	13	0	0	0		34		0		0		0	0	0		0	0		0	
GP-55 (63-65)	1/1/1994	5,324	280	670	39	0	1,100		2,900		15		0		0	0	0		0	0		0	
GP-55 (77-79)	1/1/1994	3,513	200	130	13	0	760		2,300		0		0		0	0	0		0	0		0	
GP-59 (63-65)	1/1/1994	69	13	0	0	0	0		46		0		0		0	0	0		0	0		0	
GP-59 (83-85)	1/1/1994	37	19	15	1	0	0		2		0		0		0	0	0		0	0		0	
GP-6 (55-)	1/1/1993	1,737	88	6	13	0	190		1,260		0		0		0	0	0		0	0			
GP-6 (65-)	1/1/1993	1,042	42	4	9	0	98		800		0		0		0	0	0		0	0			
GP-6 (75-)	1/1/1993	635	50	6	2	0	92		460		2		0		0	0	0		0	0			
GP-61 (63-65)	1/1/1994	129	15	25	0	0	0		75		0		0		0	0	0		0	0		0	
GP-61 (83-85)	1/1/1994	596	108	108	14	0	63		280		0		0		0	0	0		0	0		0	
GP-62 (63-65)	1/1/1994	298	230	67	0	0	0		1		0		0		0	0	0		0	0		0	
GP-62 (83-85)	1/1/1994	1,718	1,400	310	0	0	0		8		0		0		0		0		0	0		0	
GP-63 (63-65)	1/1/1994	30	1	1	25	0	0		0		0		0		2	0	0		0	0		0	
GP-63 (83-85)	1/1/1994	11	9	2	0	0	0		0		0		0		0	0	0		0	0		0	
GP-64 (63-65)	1/1/1994	33	3	8	7	0	0		13		0		0		0	0	0		0	0		0	
GP-64 (78-80)	1/1/1994	36	1	1	0	0	0		32		0		0		0	0	0		0	0		0	
GP-65 (63-65)	1/1/1994	54	19	2	1	0	3		23		0		0		0	0	0		0	0		0	
GP-65 (83-85)	1/1/1994	68	6	2	0	0	10		38		0		0		0	0	0		0	0		0	
GP-66 (63-65)	1/1/1994	12	1	0	2	0	0		6		0		0		0	0	0		0	0		0	
GP-68 (63-65)	1/1/1994	2	0	1	0	0	0		1		0		0		0	0	0		0	0		0	
GP-68 (83-85)	1/1/1994	2	0	1	0	0	0		1		0		0		0	0	0		0	0		0	
GP-69 (63-65)	1/1/1994	0	0	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-69 (83-85)	1/1/1994	0	0	0	0	0	0		0		0		0		0	0	0		0	0		0	
GP-7 (55-)	1/1/1993	19	5	4	0	0	0		9		0		0		0	0	0		0	0			
GP-7 (65-)	1/1/1993	24	8	6	0	0	0		11		0		0		0	0	0		0	0			
GP-7 (75-)	1/1/1993	0	0	0	0	0	0		0		0		0		0	0	0		0	0			
GP-70 (63-65)	1/1/1994	28	4	8	10	0	0		4		0		0		0	0	0		0	0		0	
GP-70 (83-85)	1/1/1994	11	5	1	2	0	0		1		0		0		0	0	0		0	0		0	

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(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
GP-72 (63-65)	1/1/1994	1,390	1,300	71	19	0	0		0		0		0		0	0	0		0	0		0	
GP-72 (83-85)	1/1/1994	91,338	83,000	5,900	2,400	27	0		11		0		0		0	0	0		0	0		0	
GP-73 (63-65)	1/1/1994	28	8	0	0	0	0		0		0		0		0	7	0		4	10		0	
GP-73 (83-85)	1/1/1994	59	21	0	0	0	0		0		0		0		0	9	0		7	21		0	
GP-74 (63-65)	1/1/1994	10,093	10,000	69	17	0	0		7		0		0		0	0	0		0	0		0	
GP-74 (83-85)	1/1/1994	332	300	8	0	0	0		17		0		0		0	2	0		1	4		0	
GP-75 (63-65)	1/1/1994	2,034	1,600	45	0	0	0		350		0		0		0	0	0		0	0		0	
GP-75 (83-85)	1/1/1994	688	49	63	0	0	45		470		0		0		0	0	0		0	0		0	
GP-78 (63-65)	1/1/1994	847	15	0	0	0	0		280		0		0		0	0	0		0	29		23	
GP-8 (55-)	1/1/1993	0	0	0	0	0	0		0		0		0		0	0	0		0	0			
GP-8 (65-)	1/1/1993	0	0	0	0	0	0		0		0		0		0	0	0		0	0			
GP-8 (75-)	1/1/1993	1	0	0	0	0	0		1		0		0		0	0	0		0	0			
GP-80 (63-65)	1/1/1994	17,877	65	0	0	0	100		9,800		12		0		0	0	0		0	0		0	
GP-80 (83-85)	1/1/1994	17,700	0	0	0	0	0		9,800		0		0		0	0	0		0	0		0	
GP-81 (63-65)	1/1/1994	1,746	120	11	0	0	95		1,400		0		0		0	0	0		0	0		0	
GP-81 (83-85)	1/1/1994	3,700	140	0	10	0	320		3,000		0		0		0	0	0		0	0		0	
GP-82 (63-65)	1/1/1994	1,910	82	53	0	0	140		1,600		0		0		0	0	0		0	0		0	
GP-82 (83-85)	1/1/1994	387	32	86	0	0	59		200		0		0		0	0	0		0	0		0	
GP-83 (63-65)	1/1/1994	3,314	60	260	14	0	330		2,500		0		0		0	0	0		0	0		0	
GP-84 (63-65)	1/1/1994	64	2	23	0	0	3		9		0		0		0	8	0		4	10		0	
GP-84 (83-85)	1/1/1994	22	12	0	0	0	0		10		0		0		0	0	0		0	0		0	
GP-85 (63-65)	1/1/1994	26	1	0	0	0	0		6		0		0		0	4	0		5	10		0	
GP-86 (63-65)	1/1/1994	13	2	0	0	0	0		0		0		0		0	2	0		2	6		0	
GP-86 (83-85)	1/1/1994	8	1	0	0	0	0		0		0		0		0	0	0		2	5		0	
GP-87 (63-65)	1/1/1994	142	57	0	0	0	0		46		0		0		0	0	0		0	21		0	
GP-87 (83-85)	1/1/1994	160	0	14	2	0	66		48		0		0		0	2	0		0	4		0	
GP-88 (63-65)	1/1/1994	12	5	0	0	0	0		0		0		0		0	3	0		0	4		0	
GP-88 (83-85)	1/1/1994	10	2	0	0	0	0		0		0		0		0	3	0		0	5		0	
GP-9 (65-)	1/1/1993	74	70	2	2	0	0		0		0		0		0	0	0		0	0			
GP-9 (75-)	1/1/1993	41	40	1	0	0	0		0		0		0		0	0	0		0	0			
GP-9 (85-)	1/1/1993	66	65	1	0	0	0		0		0		0		0	0	0		0	0			
GP-90 (63-65)	1/1/1994	33	0	0	0	0	0		2		0		0		0	7	0		6	17		0	
GP-90 (83-85)	1/1/1994	18	1	0	0	0	0		3		0		0		0	3	0		3	8		0	
GP-91 (63-65)	1/1/1994	17	0	0	0	0	0		0		0		0		0	4	0		4	10		0	

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GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
NYSDEC Class GA Standards (a)			5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
GP-91 (83-85)	1/1/1994	6	0	0	0	0	0		0		0		0		0	2	0		0	3		0	
GP-92 (63-65)	1/1/1994	31	12	6	0	0	0		1		0		0		0	2	0		2	7		0	
GP-92 (83-85)	1/1/1994	94	21	5	13	0	4		38		0		0		0	3	0		0	2		0	
GP-93 (63-65)	1/1/1994	33	11	14	5	0	0		1		0		0		0	0	0		0	0		0	
GP-93 (83-85)	1/1/1994	39	11	19	2	0	0		1		0		0		0	2	0		0	2		0	
GP-94 (63-65)	1/1/1994	78	33	0	45	0	0		0		0		0		0	0	0		0	0		0	
GP-94 (83-85)	1/1/1994	196	170	15	11	0	0		0		0		0		0	0	0		0	0		0	
GP-95 (63-65)	1/1/1994	399	170	89	140	0	0		0		0		0		0	0	0		0	0		0	
GP-95 (83-85)	1/1/1994	13,951	12,000	1,900	23	0	0		28		0		0		0	0	0		0	0		0	
GP-96 (63-65)	1/1/1994	50	3	7	15	0	0		23		0		0		0	0	0		0	0		0	
GP-96 (83-85)	1/1/1994	38	1	7	26	0	0		1		0		0		0	0	0		0	2		0	
GP-97 (63-65)	1/1/1994	53,357	46,000	3,700	3,600	0	0		57		0		0		0	0	0		0	0		0	
GP-97 (83-85)	1/1/1994	101,182	92,000	5,000	4,100	0	0		82		0		0		0	0	0		0	0		0	
GP-98 (63-65)	1/1/1994	20	4	0	0	0	0		16		0		0		0	0	0		0	0		0	
GP-98 (83-85)	1/1/1994	6	2	0	0	0	0		4		0		0		0	0	0		0	0		0	
GP-99 (63-65)	1/1/1994	330	10	320	0	0	0		0		0		0		0	0	0		0	0		0	
GP-99 (83-85)	1/1/1994	79	79	0	0	0	0		0		0		0		0	0	0		0	0		0	
GRAYCO MW-3	1/1/1993	12	2	0			0	0	10		0		0		0	0	0		0	0			
GRAYCO MW-3	1/1/1995	33	9	22			0	0	2	0	0	0	0	0	0	0	0	0			0	0	0
HARMON MW-1	1/1/1993	2,979	9	660			0	2,300	10		0		0		0	0	0		0	0			
HP-01 (100)	9/8/1997	46	41	3	1		0		1		0	0										0	
HP-01 (110)	9/8/1997	8	8	0	0		0		0		0	0										0	
HP-01 (120)	9/8/1997	28	27	1	0		0		0		0	0										0	
HP-01 (130)	9/8/1997	7	7	0	0		0		0		0	0										0	
HP-01 (140)	9/8/1997	44	44	0	0		0		0		0	0										0	
HP-01 (150)	9/8/1997	552	200	175	129		5		29		0	0										14	
HP-01 (60)	9/8/1997	0	0	0	0		0		0		0	0										0	
HP-01 (70)	9/8/1997	0	0	0	0		0		0		0	0										0	
HP-01 (80)	9/8/1997	22	22	0	0		0		0		0	0										0	
HP-01 (90)	9/8/1997	1	1	0	0		0		0		0	0										0	
HP-02 (100)	9/11/1997	5	5	0	0		0		0		0	0										0	
HP-02 (110)	9/11/1997	4	4	0	0		0		0		0	0										0	
HP-02 (120)	9/11/1997	5	5	0	0		0		0		0	0										0	
HP-02 (130)	9/11/1997	7	7	0	0		0		0		0	0										0	

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

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N/A - Not applicable.

GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
HP-02 (140)	9/11/1997	2	2	0	0		0		0		0	0										0	
HP-02 (150)	9/11/1997	3	3	0	0		0		0		0	0										0	
HP-02 (60)	9/11/1997	0	0	0	0		0		0		0	0										0	
HP-02 (70)	9/11/1997	27	27	0	0		0		0		0	0										0	
HP-02 (80)	9/11/1997	6	6	0	0		0		0		0	0										0	
HP-02 (90)	9/11/1997	9	9	0	0		0		0		0	0										0	
HP-03 (100)	9/15/1997	2	1	0	0		0		1		0		0			0						0	
HP-03 (110)	9/15/1997	241	77	45	99		1		16		0		0			0						0	
HP-03 (120)	9/15/1997	161	13	46	100		0		2		0		0			0						0	
HP-03 (130)	9/15/1997	268	42	202	23		0		1		0		0			0						0	
HP-03 (140)	9/15/1997	33	4	0	4		0		25		0		0			0						0	
HP-03 (150)	9/15/1997	45	4	0	4		0		29		0		0			3						0	
HP-03 (60)	9/15/1997	0	0	0	0		0		0		0		0			0						0	
HP-03 (70)	9/15/1997	4	2	0	0		0		2		0		0			0						0	
HP-03 (80)	9/15/1997	5	3	0	0		0		2		0		0			0						0	
HP-03 (90)	9/15/1997	18	5	2	0		0		11		0		0			0						0	
HP-04 (100)	9/17/1997	0	0	0	0		0		0		0		0			0						0	
HP-04 (110)	9/17/1997	0	0	0	0		0		0		0		0			0						0	
HP-04 (120)	9/17/1997	0	0	0	0		0		0		0		0			0						0	
HP-04 (130)	9/17/1997	0	0	0	0		0		0		0		0			0						0	
HP-04 (140)	9/17/1997	1	1	0	0		0		0		0		0			0						0	
HP-04 (150)	9/17/1997	0	0	0	0		0		0		0		0			0						0	
HP-04 (60)	9/17/1997	1	0	1	0		0		0		0		0			0						0	
HP-04 (70)	9/17/1997	0	0	0	0		0		0		0		0			0						0	
HP-04 (80)	9/17/1997	0	0	0	0		0		0		0		0			0						0	
HP-04 (90)	9/17/1997	0	0	0	0		0		0		0		0			0						0	
HP-05 (60')	9/22/1997	753	53	570	0	0	0	0	130	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HP-05 (70')	9/22/1997	908	48	680	0	0	5	0	170	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HP-05 (80')	9/22/1997	1,638	99	1,400	0	0	0	0	100	0	0	0	0	0	0	39	0	0	0	0	0	0	0
LONIJO MW-1	1/1/1993	202	86	17			0	95	2		0		0		0	0	0		0	0			
MDC-1D (93-103)	11/17/1998	4,750	0	0			430	0	3,700	0	0		0	0								0	
MDC-1D (93-103)	11/18/1998	2,818	0	0			144	0	2,410	0	0		0	0								0	
MDC-1S (51-62)	11/18/1998	26,500	0	0			1,700	0	2,00	0	0			0								0	
mw-1	10/1/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

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Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
mw-1	12/31/1998	199	0	69		0		130	0				0	0	0	0	0	0			0	0	
mw-1	10/1/1999	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0	0		0	
mw-2	10/1/1998	120	0	120			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
mw-2	10/1/1999	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0	0		0	
mw-201	1/1/1996	13	5	2			0	1	2		0				0	2	0	1				0	
mw-201	2/1/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
mw-202	1/1/1996	186	15	5			2	13	89		62				0	0	0	0				0	
mw-202	2/1/1998	118	14	0			0	0	49	0	0	0	0	0	0	0	0	0			0	0	0
mw-203	1/1/1996	191	14	19			1	99	33		10				0	2	0	3				0	
mw-203	2/1/1998	124	11	14			0	66	21	0	0	0	0	0	0	12	0	0			0	0	0
mw-3	1/1/1993	29	1	3			0	0	23		0		0		0	0	0		0	0			
mw-3	1/1/1995	40	2	2			5	0	30	0	0	0	0	0	0	0	0	0			0	0	0
mw-3	10/1/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
mw-3	12/31/1998	103	4	88		4		0	5				0	0	0	0	0	0			0	0	
mw-3	10/1/1999	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0	0		0	
mw-4	1/1/1993	1,280	360	56			64	35	720		0		0		0	0	0		0	0			
mw-4	12/1/1995	678	220	48	32	0	26		320		0		0		0	0	0		0	0		0	
mw-4	10/1/1998	389	120	24			20	13	200	0	0	0	0	0	0	0	0	0			0	0	0
mw-7	1/1/1993	1,067	32	20			48	17	840		0		0		0	0	0		0	0			
mw-7	1/1/1995	1,324	59	28			130	23	930	2	0	2	0	0	0	0	0	0			0	0	0
mw-7	10/1/1998	855	45	16			54	0	560	0	0	0	0	0	0	0	0	0			0	0	0
N-10292	7/18/1990	1	1	0	0	0	0	0	0	0	0	0	0		0	0	0					0	
N-10318	12/4/1984	0	0	0	0	0	0		0	0		0			0	0	0					0	
N-10318	3/26/1985	1	1	0	0	0	0		0	0		0			0	0	0					0	
N-10318	12/27/1985	3	2	0	0	0	0		1	0		0			0	0	0					0	
N-10318	10/1/1987	5	5	0	0	0	0		0	0		0			0	0	0					0	
N-10318	10/27/1989	8	8	0	0	0	0		0	0	0	0			0	0	0						
N-10318	6/7/1990	2	0	0	0	0	0	0	0	0	0	2	0		0	0	0					0	
N-10318	9/18/1990	2	2	0	0	0	0		0	0	0	0	0		0	0	0					0	
N-10318	2/28/1991	2	2	0	0	0	0	0	0	0	0	0	0		0	0	0	0				0	
N-10318	5/21/1991	1	1	0	0	0	0		0	0	0	0	0		0	0	0		0			0	
N-10318	1/1/1993	1	1	0			0	0	0		0		0		0	0	0		0	0			
N-10319	10/16/1984	321	62	190	0	0			69	0		0			0	0	0						
N-10319	12/4/1984	2,540	1,200	1,300	0	0			40	0		0			0	0	0						

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

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Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
N-10319	3/13/1985	2,650	420	2,100	0	0			130	0		0			0	0							
N-10319	3/26/1985	2,922	470	2,300	0	0			150	2		0			0	0							
N-10319	12/27/1985	3,540	950	2,200			0		390			0			0	0	0					0	
N-10319	1/31/1986	4,261	2,200	1,500					560	1		0			0	0	0						
N-10319	9/4/1987	8,825	1,500	7,200			0		120	5		0			0	0	0					0	
N-10319	10/27/1989	6,128	1,400	4,300	350	1	3		62	7	0	0			0	0	0						
N-10319	6/18/1990	6,583	950	4,500	540	5	18	540	12	10	0	0	1		1	0	0					0	
N-10319	9/17/1990	2,440	670	1,500	220	4	20		19	4			0		0	0	0					0	
N-10319	4/10/1991	2,633	460	1,600	230	1	7	230	99	3	0	0	0		0	0	0	0	0			0	
N-10319	1/23/1997	924	510	290	0	0	0	24	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N-10320	6/12/1990	11	4	0	0	0	0	0	1	6	0	0	0		0	0	0					0	
N-10320	3/6/1991	13	7	0	0	0	0		0	6	0	0	0		0	0	0	0				0	
N-10320	1/1/1993	2	2	0			0	0	0		0		0		0	0	0		0	0			
N-10320	1/1/1995	4	3	0			0	0	0	0	0	1	0	0	0	0	0	0			0	0	0
N-10321	12/4/1984	165	2	160	0	0	0		3	0		0			0	0	0					0	
N-10321	3/25/1985	182	2	150	0	0			30	0		0			0	0	0						
N-10321	12/24/1985	818	58	270	0	0	0		490	0		0			0	0	0					0	
N-10321	9/16/1987	119	9	34	0	0	0		76	0		0			0	0	0					0	
N-10321	6/13/1990	65	14	6	0	0	7		24	14	0	0	0		0	0	0					0	
N-10321	9/14/1990	24	5	3	0	0	3		13	0	0	0	0		0	0	0					0	
N-10321	3/7/1991	66	9	4	0	0	15		38	0	0	0	0		0	0	0	0				0	
N-10321	5/22/1991	145	19	9	0	0	6		110	0	0	0	0		0	0	0		0			0	
N-10321	1/1/1993	34	3	0			2	0	26		0		0		3	0	0		0	0			
N-10321	1/1/1995	28	6	2			0	0	20	0	0	0	0	0	0	0	0	0			0	0	0
N-10321	4/21/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-10321	8/18/1999	0	0	0			0	0	0		0	0	0	0	0			0			0	0	
N-10322	12/4/1984	35	13	14	0	0	0		8	0		0			0	0	0					0	
N-10322	3/25/1985	22	10	7	0	0	0		5	0		0			0	0	0					0	
N-10322	12/24/1985	8	5	1	0	0	0		2	0		0			0	0	0					0	
N-10322	9/30/1987	4	1	2	0	0			1	0		0			0	0	0						
N-10322	10/26/1989	12	7	0	0	0	0		5	0	0	0			0	0	0						
N-10322	6/14/1990	20	7	0	0	0	1		12	0	0	0	0		0	0	0	0				0	
N-10322	9/14/1990	11	6	0	0	0	1		4	0	0	0	0		0	0	0					0	
N-10322	3/6/1991	13	5	1	0	0	2		5	0	0	0	0		0	0	0	0				0	

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

Table 5.2
New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
N-10322	5/22/1991	15	8	0	0	0	0		7	0	0	0	0		0	0	0		0			0	
N-10322	1/1/1993	17	5	3			1	0	8		0		0		0	0	0		0	0			
N-10322	1/1/1995	10	4	1			0	0	5	0	0	0	0	0	0	0	0	0			0	0	0
N-10322	4/13/1999	12	12	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-10322	8/23/1999	19	19	0			0	0	0		0	0	0	0	0			0			0	0	
N-10323	12/4/1984	0	0	0	0	0	0		0	0		0			0	0	0					0	
N-10323	3/26/1985	0	0	0	0	0	0		0	0		0			0	0	0					0	
N-10323	12/24/1985	0	0	0	0	0	0		0	0		0			0	0	0					0	
N-10323	9/17/1987	0	0	0	0	0	0		0	0		0			0	0	0					0	
N-10323	6/20/1990	0	0	0	0	0	0		0	0	0	0	0		0	0	0					0	
N-10323	3/26/1991	0	0	0	0	0	0		0	0	0	0	0		0	0	0	0				0	
N-10323	1/1/1993	5	0	2			0	0	0		0		0		0	0	0		0	3			
N-10323	9/10/1998	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-10323	8/12/1999	93	26	22			0	0	45		0	0	0	0	0			0			0	0	
N-10324	12/4/1984	591	1	0	0	0	0		420	0		0			0	0	0					0	
N-10324	2/28/1985	518	4	4		0	0		510	0		0			0	0	0					0	
N-10324	12/27/1985	5,722	10	10	0	0			4,400	2		0			0	0	0						
N-10324	9/17/1987	1,580	0	0	0	0	0		1,200	0		0			0	0	0					0	
N-10324	10/30/1989	1,874	130	120	4	0	69		1,500	0	0	0			0	0	0						
N-10324	6/7/1990	1,344	130	69	4	0	410		700	0	0	5	2		0	0	0					0	
N-10324	9/18/1990	1,924	73	36	1	0	490		1,300	0	1	0	1		0	0	0					1	
N-10324	4/4/1991	2,756	30	21	0	0	87		2,600	0	0	0	0		0	0	0	0	0			0	
N-10324	1/1/1993	442	29	36			19	0	350		0		0		0	0	0		0	0			
N-10324	1/1/1995	145	20	26			12	0	52	0	0	0	0	0	7	7	0	0			0	13	0
N-10324	4/15/1999	78	18	13			0	0	47	0	0	0	0	0	0	0	0	0			0	0	0
N-10324	8/13/1999	87	24	21			0	0	42		0	0	0	0	0			0			0	0	
N-10325	12/4/1984	2,419	2,300	68					42	0		9			0	0	0						
N-10325	3/26/1985	946	920	12	0	0	0		13	0		1			0	0	0					0	
N-10325	12/27/1985	481	440	10	0	0	0		31	0		0			0	0	0					0	
N-10325	9/28/1987	264	170	85			0		9	0		0			0	0	0					0	
N-10325	10/27/1989	6,682	6,400	200	24	0	10		47	0	0	0			0	0	0						
N-10325	6/12/1990	3,553	3,400	92	30	0	10		19	1	0	1	0		0	0	0					0	
N-10325	9/17/1990	2,043	1,900	81	22	0	11		27	0	0	1	0		0	0	0					0	
N-10325	4/8/1991	702	640	49	4	0	0		9	0	0	0	0		0	0	0	0	0			0	

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.
(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
N/A - Not applicable.
GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
NYSDEC Class GA Standards (a)			5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
N-10325	1/1/1993	95	51	33			0	9	2		0		0		0	0	0		0	0			
N-10325	1/1/1995	13	11	2			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-10325	4/13/1999	42	42	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-10325	8/20/1999	33	33	0			0	0	0		0	0	0	0	0			0			0	0	
N-10326	12/5/1984	134	46	24	0	0	0		50	0		13			0	0	0					0	
N-10326	3/25/1985	523	72	39	0	0			150	0		250			0	0	0						
N-10326	12/27/1985	488	62	100	0	0			180	0		110			0	0	0						
N-10326	9/28/1987	577	55	70	0	0			110	0		300			0	0	0						
N-10326	10/26/1989	343	86	32	29	0	9		81	0	0	82			0	0	0						
N-10326	6/18/1990	485	170	18	44	0	30		110	0	0	63	2		0	0	0					0	
N-10326	9/14/1990	406	160	6	2	0	35		130	0	0	62	1		0	0	0					0	
N-10326	4/2/1991	686	177	63	46	0	24		187	0	0	136	0		0	0	0	0	0			0	
N-10326	1/1/1993	245	89	13			12	15	110		0		0		0	0	0		0	0			
N-10326	1/1/1995	723	280	38			8	330	62	0	0	1	0	0	0	0	0	0			0	0	0
N-10326	4/13/1999	252	89	11			0	110	42	0	0	0	0	0	0	0	0	0			0	0	0
N-10326	8/19/1999	860	280	18			0	480	82		0	0	0	0	0			0			0	0	
N-10327	12/5/1984	2	1	0	0	0	0		1	0		0			0	0	0					0	
N-10327	3/25/1985	2	1	0	0	0	0		1	0		0			0	0	0					0	
N-10327	12/26/1985	2	1	0	0	0	0		1	0		0			0	0	0					0	
N-10327	9/3/1987	0	0	0	0	0	0		0	0		0			0	0	0					0	
N-10327	10/27/1989	255	5	0	1	0	16		230	0	2	0			0	0	0						
N-10327	6/12/1990	59	5	0	4	0	15		35	0	0	0	0		0	0	0					0	
N-10327	9/17/1990	15	4	0	2	0	1		8	0	0	0	0		0	0	0					0	
N-10327	3/27/1991	30	3	0	0	0	3		24	0	0	0	0		0	0	0	0				0	
N-10327	1/1/1993	0	0	0			0	0	0		0		0		0	0	0		0	0			
N-10327	4/15/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-10327	8/20/1999	0	0	0			0	0	0		0	0	0	0	0			0			0	0	
N-10328	12/5/1984	225	32	150					35	0		8			0	0	0						
N-10328	3/27/1985	172	20	120	0	0			26	0		6			0	0	0						
N-10328	12/27/1985	157	14	120	0	0			20	0		3			0	0	0						
N-10328	9/29/1987	32	4	17			0		11	0		0			0	0	0					0	
N-10328	10/26/1989	24	3	12	2	0	2		5	0	0	0			0	0	0						
N-10328	7/16/1990	41	4	17	5	0	6		8	0	0	0	0		0	0	0					0	
N-10328	9/14/1990	16	3	4	2	0	2		5	0	0	0	0		0	0	0					0	

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
N-10328	3/13/1991	23	3	7	3	0	3		6	0	0	0	0		0	0	0	0				0	
N-10328	1/1/1993	6	0	2			0	0	4		0		0		0	0	0		0	0			
N-10328	11/18/1998	66	0	3			6	0	54	0	0			0								0	
N-10328	4/15/1999	639	0	0			63	0	540	0	0	0	0	0	0	0	0	0			0	0	0
N-10328	8/19/1999	1,036	0	0			58	0	950		0	0	0	0	0			0			0	0	
N-10329	12/5/1984	5	1	1	0	0	0		3	0		0			0	0	0					0	
N-10329	3/27/1985	9	7	1	0	0	0		1	0		0			0	0	0					0	
N-10329	12/26/1985	3	0	0	0	0	0		3	0		0			0	0	0					0	
N-10329	9/29/1987	0	0	0	0	0	0		0	0		0			0	0	0					0	
N-10329	10/30/1989	2	0	0	0	0	0		2	0	0	0			0	0	0						
N-10329	5/24/1990	2	0	0	0	0	0		1	0	0	1	0		0	0	0	0				0	
N-10329	9/18/1990	2	0	0	0	0	0		2	0	0	0	0		0	0	0					0	
N-10329	2/21/1991	1	0	0	0	0	0		1	0	0	0	0		0	0	0	0				0	
N-10329	1/1/1993	0	0	0			0	0	0		0		0		0	0	0		0	0			
N-10329	1/1/1995	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-10329	4/15/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-10329	8/12/1999	0	0	0			0	0	0		0	0	0	0	0			0			0	0	
N-10458	11/25/1985	541	41	68			0		430	0		2										0	
N-10458	1/31/1986	487	90	64	0	0			260	0		2			0	0	0						
N-10458	10/2/1987	375	240	26	0	0			75	0		0			0	0	0						
N-10458	6/18/1990	141	10	34	2	0	20		28	0	0	2	2		0	0	0					0	
N-10458	10/11/1990	206	74	110	15	0	1		3	0	0	0	0		0	0	0					0	
N-10458	3/29/1991	148	51	61	4	0	3		21	0	0	0	0		0	0	0	0				0	
N-10458	1/1/1995	483	290	100			0	87	3	0	0	0	0	0	0	0	0	0			0	0	0
N-10458	1/23/1997	270	160	81	0	0	0	0	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N-10459	10/28/1985	5	0	0	0	0			5	0		0			0	0	0						
N-10459	12/31/1985	8	0	0	0	0	0		8	0		0			0	0	0					0	
N-10459	10/1/1987	1	0	0	0	0	0		1	0		0			0	0	0					0	
N-10459	11/27/1989	6	2	0	0	0	0		2	0	0	0			0	0	0						
N-10459	7/25/1990	1	0	0	0	0	0		0	0	0	0	0		0	0	0					0	
N-10459	3/27/1991	0	0	0	0	0	0		0	0	0	0	0		0	0	0	0				0	
N-10459	1/1/1993	2	0	0			0	0	0		0		0		2	0	0		0	0			
N-10459	4/15/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-10459	8/12/1999	0	0	0			0	0	0		0	0	0	0	0			0			0	0	

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

Table 5.2
New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
N-10460	10/28/1985	0	0	0	0	0			0	0		0			0	0	0						
N-10460	12/31/1985	0	0	0	0	0	0		0	0		0			0	0	0					0	
N-10460	9/29/1987	0	0	0	0	0	0		0	0		0			0	0	0					0	
N-10460	11/27/1989	3	0	0	0	0	0		3	0	0	0			0	0	0						
N-10460	6/5/1990	2	0	0	0	0	0		0	0	0	2	0		0	0	0					0	
N-10460	10/19/1990	4	4	0	0	0	0		0	0	0	0	0		0	0	0					0	
N-10460	3/26/1991	1	0	0	0	0	0		1	0	0	0	0		0	0	0	0				0	
N-10460	1/1/1993	1	0	0			0	0	0		0		0		0	0	0		0	1			
N-10460	1/1/1995	3	0	0			0	0	3	0	0	0	0	0	0	0	0	0			0	0	0
N-10461	10/30/1985	4	0	0	0	0			4	0		0			0	0	0						
N-10461	12/31/1985	5	0	0	0	0	0		5	0		0			0	0	0					0	
N-10461	10/2/1987	3	0	0	0	0	0		3	0		0			0	0	0					0	
N-10461	6/5/1990	6	0	0	0	0	0		0	0	0	3	0		0	2	1					0	
N-10461	3/5/1991	13	0	0	0	0	2		4	0	0	1	0		0	0	0	0				0	
N-10461	1/1/1993	0	0	0			0	0	0		0		0		0	0	0		0	0			
N-10461	1/1/1995	7	0	0			0	0	3	0	0	1	0	0	0	0	0	0			0	0	0
N-10462	10/28/1985	5	3	2	0	0			0	0		0			0	0	0						
N-10462	12/31/1985	16	9	7	0	0	0		0	0		0			0	0	0					0	
N-10462	10/2/1987	154	110	44	0	0	0		0	0		0			0	0	0					0	
N-10462	11/27/1989	249	200	45	0	0	0		4	0	0	0			0	0	0						
N-10462	6/5/1990	73	61	8	0	0	0		2	0	0	2	0		0	0	0					0	
N-10462	10/19/1990	103	91	8	0	0	1		3	0	0	0	0		0	0	0					0	
N-10462	3/7/1991	42	35	4	0	0	0		3	0	0	0	0		0	0	0	0				0	
N-10462	1/1/1993	61	61	0			0	0	0		0		0		0	0	0		0	0			
N-10462	1/1/1995	56	56	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-10462	4/21/1999	14	14	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-10462	8/12/1999	0	0	0			0	0	0		0	0	0	0	0			0			0	0	
N-10463	10/31/1985	2	0	0	0	0			2	0		0			0	0	0						
N-10463	12/30/1985	2	0	0	0	0	0		2	0		0			0	0	0					0	
N-10463	9/30/1987	3	3	0	0	0	0		0	0		0			0	0	0					0	
N-10463	11/13/1989	25	25	0	0	0	0		0	0	0	0			0	0	0						
N-10463	6/13/1990	4	4	0	0	0	0		0	0	0	0	0		0	0	0					0	
N-10463	9/19/1990	4	4	0	0	0	0		0	0	0	0	0		0	0	0					0	
N-10463	2/28/1991	1	1	0	0	0	0		0	0	0	0	0		0	0	0	0				0	

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.
(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
N/A - Not applicable.
GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
N-10463	1/1/1993	0	0	0			0	0	0		0		0		0	0	0		0	0			
N-10463	1/1/1995	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-10463	1/23/1997	41	41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N-10464	11/25/1985	23	3	11			0		9	0		0										0	
N-10464	12/30/1985	8	2	2	0	0	0		4	0		0			0	0	0					0	
N-10464	11/13/1989	13	5	0	0	0	0		8	0	0	0			0	0	0						
N-10464	6/7/1990	35	13	0	0	0	2		19	0	0	0	0		0	0	0					0	
N-10464	3/12/1991	24	12	0	0	0	3		7	0	0	0	0		0	0	0	0				0	
N-10464	1/1/1993	2	2	0			0	0	0		0		0		0	0	0		0	0			
N-10464	1/1/1995	2	2	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-10464	4/13/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-10464	8/23/1999	0	0	0			0	0	0		0	0	0	0	0			0			0	0	
N-10465	10/30/1985	123	9	2	0	0			2	0		110			0	0	0						
N-10465	12/30/1985	112	14	3	0	0	0		2	0		93			0	0	0					0	
N-10465	9/30/1987	13	6	0	0	0	0		0	0		7			0	0	0					0	
N-10465	11/14/1989	54	41	5	0	0	0		3	0	0	5			0	0	0						
N-10465	6/12/1990	39	28	2	1	0	0		3	0	0	5	0		0	0	0					0	
N-10465	9/19/1990	52	33	2	1	0	1		4	0	0	8	0		0	0	0					0	
N-10465	3/13/1991	26	16	0	0	0	0		3	0	0	7	0		0	0	0	0				0	
N-10465	1/1/1993	11	6	0			0	0	0		0		0		0	0	0		5	0			
N-10465	4/13/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-10465	8/23/1999	0	0	0			0	0	0		0	0	0	0	0			0			0	0	
N-10466	10/31/1985	233	100	36	0	0			94	0		0			0	0	3						
N-10466	12/30/1985	401	130	11	0	0	0		260	0		0			0	0	0					0	
N-10466	9/30/1987	0	0	0	0	0	0		0	0		0			0	0	0					0	
N-10466	11/13/1989	35	10	0	0	0	2		18	0	5	0			0	0	0						
N-10466	6/4/1990	88	38	27	1	0	5		15	0	0	2	0		0	0	0					0	
N-10466	6/5/1990	70	31	23	1	0	4		9	0	0	2	0		0	0	0					0	
N-10466	11/14/1990	86	37	24	1	0	5		18	0	0	1	0		0	0	0					0	
N-10466	1/29/1991	35	15	11	0	0	2		7	0	0	0	0		0	0	0	0				0	
N-10466	1/1/1993	28	14	11			0	0	3		0		0		0	0	0		0	0			
N-10466	1/1/1995	26	18	5			0	0	3	0	0	0	0	0	0	0	0	0			0	0	0
N-10467	10/30/1985	421	240	86	0	0	0		58	0		11			0	0	0					0	
N-10467	12/30/1985	920	450	310					150	0		10			0	0	0						

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
N-10467	11/22/1989	302	170	53	41	0	4		25	0	0	3			0	0	0						
N-10467	6/13/1990	269	190	27	32	0	4		12	0	0	2	0		0	0	0					0	
N-10467	11/14/1990	135	100	10	2	0	2		14	0	0	1	1		0	0	0					0	
N-10467	4/8/1991	247	160	33	17	0	1		20	0	0	2	0		0	0	0	0	0			0	
N-10467	1/1/1993	162	130	18			0	9	5		0		0		0	0	0		0	0			
N-10468	11/26/1985	6	0	0			0		6	0		0										0	
N-10468	12/23/1985	10	2	0	0	0	0		8	0		0			0	0	0					0	
N-10468	12/1/1989	12	1	0	1	0	1		3	0	0	2			0	0	0						
N-10468	7/19/1990	22	1	0	0	0	4		10	0	0	0	1		0	0	0					0	
N-10468	10/10/1990	12	0	0	0	0	3		9	0	0	0	0		0	0	0					0	
N-10468	3/6/1991	20	0	0	0	0	3		8	0	0	0	1		0	0	0	0				0	
N-10468	1/1/1993	1	1	0			0	0	0		0												
N-10469	10/30/1985	20	0	9	0	0			11	0		0			0	0	0						
N-10469	12/23/1985	27	0	13	0	0			14	0		0			0	0	0						
N-10469	10/2/1987	27	0	22	0	0			5	0		0			0	0	0						
N-10469	11/14/1989	172	2	22	3	0	4		64	0	0	0			0	0	0						
N-10469	6/14/1990	126	8	20	3	0	12		41	0	0	0	3		0	0	0	0				0	
N-10469	10/10/1990	46	3	11	2	0	4		15	0	0	0	2		0	0	0					0	
N-10469	1/1/1993	20	0	17			0	0	0		0		0		3	0	0		0	0			
N-10470	10/30/1985	551	100	9					370	0		0			0	0	0						
N-10470	12/23/1985	653	280	0					320	0		0			0	0	0						
N-10470	6/20/1990	1,659	84	8	21	0	470		910	0	2	3	10		0	0	0					1	
N-10470	7/17/1990	1,909	120	8	15	1	470		1,200	0	2	0	11		0	0	0					1	
N-10470	4/4/1991	2,469	170	17	18	0	62		2,000	0	2	0	0		0	0	0	0	0			0	
N-10470	1/1/1993	89,000	0	0			0	0	9,00		0		0		0	0	0		0	0			
N-10470	1/1/1994	59,000	0	0	0	0	0		5,00		0		0		0	0	0		0	0		0	
N-10470	1/1/1995	37,275	76	11			1,000	20	4,00	0	10	1	1	1,100	0	0	0	0			0	56	0
N-10470	10/1/1998	24,826	11	0			940	0	2,00	0	15	0	0	60	0	0	0	0			0	0	0
N-10470	11/18/1998	18,100	0	0			900	0	6,00	0				0								0	
N-10470	4/13/1999	9,688	51	0			0	18	9,600	0	0	0	0	19	0	0	0	0			0	0	0
N-10470	8/19/1999	35,718	27	0			1,400	13	2,00		0	0	0	68	0			0			0	0	
N-10471	10/31/1985	987	340	74					470	3		0			0	0	0						
N-10471	12/24/1985	1,532	620	120					700	4		0			0	0	0						
N-10471	10/2/1987	1,082	480	87					450	4		0			0	0	0						

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
N-10471	11/14/1989	375	170	26	20	0	15		110	0	0	0			0	0	0						
N-10471	6/20/1990	378	140	19	19	0	35		75	0	0	2	2		0	0	0					0	
N-10471	4/2/1991	441	190	33	18	0	16		140	2	0	0	0		0	0	0	0	0			0	
N-10471	1/1/1993	207	76	12			8	19	66		0		0		0	0	0		0	0			
N-10471	1/1/1995	159	46	8			5	29	51	0	0	0	0	0	0	0	0	0			0	0	0
N-10471	4/15/1999	10	0	0			0	0	10	0	0	0	0	0	0	0	0	0			0	0	0
N-10471	8/20/1999	59	19	0			0	17	23		0	0	0	0	0			0			0	0	
N-10472	10/28/1985	14	0	0	0	0	0		11	0		3			0	0	0					0	
N-10472	12/26/1985	14	0	0	0	0	0		13	0		1			0	0	0					0	
N-10472	10/1/1987	24	0	0	0	0	0		2	0		22			0	0	0					0	
N-10472	11/17/1989	5	0	0	0	0	0		2	0	0	3			0	0	0						
N-10472	5/30/1990	2	0	0	0	0	0		1	0	0	1	0		0	0	0					0	
N-10472	9/19/1990	3	0	0	0	0	0		2	0	0	1	0		0	0	0					0	
N-10472	4/15/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-10472	8/13/1999	0	0	0			0	0	0		0	0	0	0	0			0			0	0	
N-10473	10/29/1985	2	0	0	0	0			1	0		1			0	0	0						
N-10473	12/26/1985	21	0	2	0	0	0		19	0		0			0	0	0					0	
N-10473	10/1/1987	1	0	0	0	0	0		1	0		0			0	0	0					0	
N-10473	11/17/1989	4	0	0	0	0	0		4	0	0	0			0	0	0						
N-10473	5/30/1990	1	0	0	0	0	0		0	0	0	1	0		0	0	0					0	
N-10473	10/10/1990	3	0	0	0	0	0		1	0	0	1	0		1	0	0					0	
N-10473	1/1/1993	6	0	0			0	0	6		0												
N-10473	1/1/1995	8	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	8	0
N-10474	10/31/1985	162	30	78					51	0		3			0	0	0						
N-10474	11/25/1985	311	41	200			0		68	0		2										0	
N-10474	12/26/1985	342	51	200	0	0			85	0		3			3	0	0						
N-10474	12/1/1989	86	20	43	3	0	7		10	0	0	0			0	0	0						
N-10474	6/1/1990	121	33	36	8	0	17		17	0	0	0	0		0	4	1					0	
N-10474	10/10/1990	225	78	75	14	0	20		23	0	0	1	1		0	2	0					0	
N-10474	1/28/1991	130	34	32	11	0	11		20	0	0	0	3		1	4	0	6				0	
N-10474	4/23/1991	228	36	50	9	0	16		20	0	0	1	0		0	0	0		65			0	
N-10474	1/1/1995	33	7	8			3	0	6	0	0	0	0	0	0	0	0	0			0	9	0
N-10474	4/15/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-10474	8/16/1999	148	11	20			20	0	97		0	0	0	0	0			0			0	0	

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
N-10475	10/31/1985	0	0	0	0	0			0	0		0			0	0	0						
N-10475	12/31/1985	0	0	0	0	0	0		0	0		0			0	0	0					0	
N-10475	2/3/1986	0	0	0	0	0	0		0	0		0			0	0	0					0	
N-10475	10/2/1987	0	0	0	0	0	0		0	0		0			0	0	0					0	
N-10475	12/5/1989	0	0	0	0	0	0		0	0	0	0			0	0	0						
N-10475	6/4/1990	2	0	0	0	0	0		0	0	0	2	0		0	0	0					0	
N-10475	4/15/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-10476	10/29/1985	7	0	0	0	0			2	0		0			0	5	0						
N-10476	10/2/1987	1	0	0	0	0	0		1	0		0			0	0	0					0	
N-10476	12/5/1989	7	1	0	1	0	0		2	0	0	0			0	0	0						
N-10476	5/22/1990	9	0	0	3	0	0		1	0	0	2	0		0	0	0					0	
N-10476	4/15/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-10476	8/19/1999	0	0	0			0	0	0		0	0	0	0	0			0			0	0	
N-10477	11/1/1985	664	640	24					0	0		0			0	0	0						
N-10477	12/31/1985	576	560	16			0		0	0		0			0	0	0					0	
N-10477	1/31/1986	956	940	16			0		0	0		0			0	0	0					0	
N-10477	10/1/1987	97	97	0	0	0			0	0		0			0	0	0						
N-10477	11/13/1989	9	9	0	0	0	0		0	0	0	0			0	0	0						
N-10477	5/31/1990	38	33	0	4	0	0		0	0	0	1	0		0	0	0					0	
N-10477	2/5/1991	65	64	0	1	0	0		0	0	0	0	0		0	0	0	0	0			0	
N-10477	4/13/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-10477	8/18/1999	0	0	0			0	0	0		0	0	0	0	0			0			0	0	
N-10478	1/30/1985	36	6	8	0	0			21	0		1			0	0	0						
N-10478	11/25/1985	27	4	4			0		19	0		0										0	
N-10478	10/1/1987	120	26	13	0	0			50	0		0			0	0	0						
N-10478	12/1/1989	74	21	8	6	0	6		14	0	0	2			0	0	0						
N-10478	5/31/1990	70	18	5	5	0	9		15	0	0	1	1		0	0	0					0	
N-10478	10/11/1990	73	20	6	5	0	6		12	0	0	1	2		1	0	0					0	
N-10478	2/5/1991	39	14	4	3	0	5		8	0	0	0	0		0	0	0	0				0	
N-10478	4/13/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-10478	8/18/1999	14	0	0			0	0	0		0	0	0	0	0			0			14	0	
N-10479	11/25/1985	2	0	0			0		2	0		0										0	
N-10479	12/31/1985	10	0	0	0	0	0		8	0		2			0	0	0					0	
N-10479	10/1/1987	15	0	0	0	0	0		15	0		0			0	0	0					0	

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
N-10479	11/22/1989	11	0	0	0	0	0		11	0	0	0			0	0	0						
N-10479	5/23/1990	2	0	0	0	0	0		1	0	0	1	0		0	0	0					0	
N-10479	10/22/1990	6	4	0	0	0	0		2	0	0	0	0		0	0	0					0	
N-10479	4/13/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-10479	8/18/1999	0	0	0			0	0	0		0	0	0	0	0			0			0	0	
N-10480	11/26/1985	20	3	1			0		15	0		1										0	
N-10480	1/30/1986	27	4	2	0	0	0		19	0		2			0	0	0					0	
N-10480	10/1/1987	11	1	0	0	0	0		3	0		1			0	0	0					0	
N-10480	11/22/1989	27	6	2	1	0	3		5	0	0	2			0	0	0						
N-10480	5/23/1990	10	2	0	0	0	1		1	0	0	2	0		0	0	0					0	
N-10480	10/22/1990	13	6	1	0	0	1		4	0	0	0	0		0	0	0					0	
N-11841	4/23/1991	4	0	0	0	0	0		2	0	0	0	0		0	0	0	0				0	
N-11841	1/1/1993	9	0	9			0	0	0		0		0		0	0	0		0	0			
N-11842	4/23/1991	96	5	13	0	0	5		70	0	0	3	0		0	0	0	0				0	
N-11842	1/1/1993	72	0	18			0	0	54		0		0		0	0	0		0	0			
N-11842	1/1/1995	108	3	16			2	0	87	0	0	0	0	0	0	0	0	0			0	0	0
N-11843	5/23/1991	80	18	46	0	0	1		14	0	0	0	0		0	0	0	0				0	
N-11843	1/1/1993	57	12	38			0	2	5		0		0		0	0	0		0	0			
N-11843	1/1/1995	49	24	21			0	0	4	0	0	0	0	0	0	0	0	0			0	0	0
N-11843	1/23/1997	39	20	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N-11844	5/21/1991	17	3	3	0	0	1		9	0	0	0	0		0	0	0	0				0	
N-11844	1/1/1993	8	3	0			0	0	5		0		0		0	0	0		0	0			
N-11844	1/1/1995	13	5	0			0	0	8	0	0	0	0	0	0	0	0	0			0	0	0
N-11845	5/20/1991	23	1	0	0	0	2		20	0	0	0	0		0	0	0	0				0	
N-11845	1/1/1993	21	0	0			0	0	21		0		0		0	0	0		0	0			
N-11845	1/1/1995	21	1	0			2	0	18	0	0	0	0	0	0	0	0	0			0	0	0
N-11846	2/28/1991	19	4	0	0	0	3		10	0	0	0	0		0	0	0	0				0	
N-11846	1/1/1993	4	0	0			0	0	4		0		0		0	0	0		0	0			
N-11847	4/5/1991	833	9	3	2	2	190		480	3	2	0	0		0	0	0	0				0	
N-11847	1/1/1993	101	84	16			1	0	0		0		0		0	0	0		0	0			
N-11847	1/1/1995	577	460	96			0	15	6	0	0	0	0	0	0	0	0	0			0	0	0
N-11848	1/10/1991	0	0	0	0	0	0		0	0	0	0	0		0	0	0	0				0	
N-11848	4/15/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-11848	8/17/1999	0	0	0			0	0	0		0	0	0	0	0			0			0	0	

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

Table 5.2
New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
N-11849	2/5/1991	357	190	3	25	0	56		82	0	0	0	0		0	0	0	0				1	
N-11849	1/1/1993	0	0	0			0	0	0		0		0		0	0	0		0	0			
N-11849	4/15/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-11849	8/19/1999	0	0	0			0	0	0		0	0	0	0	0			0			0	0	
N-11850	2/21/1991	1	1	0	0	0	0		0	0	0	0	0		0	0	0	0				0	
N-11850	1/1/1993	179	110	44			0	0	2		0		0		23	0	0		0	0			
N-11850	1/1/1995	277	220	52			0	2	3	0	0	0	0	0	0	0	0	0			0	0	0
N-11850	4/13/1999	47	35	12			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-11850	8/18/1999	20	20	0			0	0	0		0	0	0	0	0			0			0	0	
N-11851	1/24/1991	31	4	27	0	0	0		0	0	0	0	0		0	0	0	0				0	
N-11851	1/1/1993	12	2	10			0	0	0		0		0		0	0	0		0	0			
N-11851	1/1/1995	22	11	4			0	2	0	0	0	5	0	0	0	0	0	0			0	0	0
N-11851	4/15/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-11851	8/19/1999	0	0	0			0	0	0		0	0	0	0	0			0			0	0	
N-11852	1/24/1991	518	120	330	50	2	3		5	0	0	6	1		0	0	0	0				0	
N-11852	1/1/1993	84	6	69			0	9	0		0		0		0	0	0		0	0			
N-11852	4/15/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-11852	8/19/1999	17	0	0			0	17	0		0	0	0	0	0			0			0	0	
N-11853	2/21/1991	1	1	0	0	0	0		0	0	0	0	0		0	0	0	0				0	
N-11854	2/21/1991	18	1	0	0	0	3		11	0	0	0	0		0	0	0	0				0	
N-11854	1/1/1993	0	0	0			0	0	0		0		0		0	0	0		0	0			
N-11854	1/1/1995	2	0	0			0	0	2	0	0	0	0	0	0	0	0	0			0	0	0
N-11854	4/13/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-11854	6/9/1999	2	1	0			0	0	1	0	0		0	0								0	
N-11855	5/23/1991	49	0	0	0	0	2		39	0	0	0	0		0	0	0	0				0	
N-11855	1/1/1993	0	0	0			0	0	0		0		0		0	0	0		0	0			
N-11855	1/1/1995	12	0	0			0	0	12	0	0	0	0	0	0	0	0	0			0	0	0
N-11855	4/13/1999	203	0	0			13	0	190	0	0	0	0	0	0	0	0	0			0	0	0
N-11855	6/9/1999	167	0	0			18	0	149	0	0		0	0								0	
N-11855	8/20/1999	600	0	0			20	0	580		0	0	0	0	0			0			0	0	
N-11856	5/24/1991	17	1	2	0	0	2		12	0	0	0	0		0	0	0	0				0	
N-11857	3/12/1991	32	13	7	5	0	2		5	0	0	0	0		0	0	0	0				0	
N-11858	5/21/1991	1	0	0	0	0	0		1	0	0	0	0		0	0	0	0				0	
N-11858	1/1/1995	8	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	8	0

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.
(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
N/A - Not applicable.
GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
N-11858	4/15/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-11858	8/23/1999	0	0	0			0	0	0		0	0	0	0	0			0			0	0	
N-11859	1/10/1991	0	0	0	0	0	0		0	0	0	0	0		0	0	0	0				0	
N-11859	4/21/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-11859	8/16/1999	0	0	0			0	0	0		0	0	0	0	0			0			0	0	
N-11860	1/28/1991	3	0	2	0	0	0		1	0	0	0	0		0	0	0	0				0	
N-11860	4/16/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-11860	8/23/1999	0	0	0			0	0	0		0	0	0	0	0			0			0	0	
N-11861	1/7/1991	0	0	0	0	0	0		0	0	0	0	0		0	0	0	0				0	
N-11861	4/16/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-11861	8/10/1999	0	0	0			0	0	0		0	0	0	0	0			0			0	0	
N-11862	1/7/1991	1	0	0	0	0	1		0	0	0	0	0		0	0	0	0				0	
N-11862	4/13/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-11862	8/17/1999	0	0	0			0	0	0		0	0	0	0	0			0			0	0	
N-5655	9/8/1977	0	0	0					0			0											
N-5655	2/15/1978	0	0	0					0			0											
N-5655	9/28/1978	2	0	0	0	0	0		1	0	0	0										0	
N-5655	7/12/1979	0	0	0	0	0	0		0	0	0	0										0	
N-5655	12/15/1979	0	0	0					0			0											
N-5655	7/17/1980	0	0	0	0	0	0		0	0	0	0										0	
N-5655	10/7/1980	0	0	0					0			0			0	0							
N-5655	5/22/1981	0	0	0	0	0	0		0	0	0	0	0									0	
N-5655	6/11/1981	2	0	0					2			0											
N-5655	3/15/1982	2	0	0					1			0			0	0	0						
N-5655	6/4/1982	0	0	0	0	0	0		0	0	0	0	0									0	
N-5655	7/15/1982	1	0	0		0	0		1	0	0	0			0	0	0						
N-5655	7/14/1983	1	0	0	0	0	0		0	0	0	1	0		0	0	0					0	
N-5655	9/8/1983	2	0	2			0		0		0	0			0	0	0					0	
N-5655	5/24/1984	0	0	0	0	0	0		0	0	0	0	0									0	
N-5655	2/27/1985	1	0	0		0	0		1	0		0			0	0	0					0	
N-5655	5/7/1985	37	4	0		0	0		2	0	0	0	0	0	0	0	0		0			0	
N-5655	8/7/1985	0		0	0	0	0		0	0	0	0	0									0	
N-5655	4/30/1986	1	0	0	0	0	0		0	0	0	0	0									0	
N-5655	6/23/1987	0	0	0	0	0	0		0	0		0			0	0	0					0	

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.
(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
N/A - Not applicable.
GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
N-5655	9/2/1987	5	0	0	0	0	0		4	0	0	0	0	0	0	0	0		0			0	
N-5655	3/2/1988	2	0	0	0	0	0		1	0	0	0	0	0	0	0	0		0			0	
N-5655	5/11/1988	3	0	0	0	0	0		2	0	0	0	0	0	0	0	0		0			0	
N-5655	11/8/1988	1	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-5655	2/8/1989	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-5655	5/10/1989	2	0	0	0	0	0		1	0	0	0	0	0	0	0	0		0			0	
N-5655	8/9/1989	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-5655	11/21/1989	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-5655	2/14/1990	5	0	0	0	0	0		1	0	0	0	0	0	0	0	0		0			0	
N-5655	5/22/1990	8	0	0	0	0	0		1	0	0	0	0	0	0	0	0		0			0	
N-5655	7/17/1990	2	0	0	0	0	0		1	0	0	0	0		0	0	0					0	
N-5655	7/25/1990	3	0	0	0	0	1	0	1	0	0	0	0		0	0	0					0	
N-5655	8/7/1990	6	0	0	0	0	0		2	0	0	0	0	0	0	0	0		0			0	
N-5655	11/13/1990	2	0	0	0	0	0		1	0	0	0	0	0	0	0	0		0			0	
N-5655	2/11/1991	3	0	0	0	0	0		1	0	0	0	0	0	0	0	0		0			0	
N-5655	3/27/1991	2	0	0	0	0	0	0	1	0	0	0	0		0	0	0	0				0	
N-5655	5/14/1991	2	0	0	0	0	0		1	0	0	0	0	0	0	0	0		0			0	
N-5655	5/21/1991	4	0	1	0	0	0		2	0	0	0	0	0	0	0	0		0			0	
N-5655	8/20/1991	4	0	1	0	0	0		2	0	0	0	0	0	0	0	0		0			0	
N-5655	11/20/1991	3	0	1	0	0	0		1	0	0	0	0	0	0	0	0		0			0	
N-5655	12/26/1991	4	0	1	0	0	0		1	0	0	0	0		0	0	0		0			0	
N-5655	2/11/1992	1	0	0	0	0	0		1	0	0	0	0	0	0	0	0		0			0	
N-5655	5/5/1992	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-5655	8/11/1992	4	0	1	0	0	0		2	0	0	0	0	0	0	0	0		0			0	
N-5655	11/17/1992	6	1	2	0	0	0		2	0	0	0	0	0	0	0	0		0			0	
N-5655	2/2/1993	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-5655	4/19/1993	6	1	2	0	0	0		2	0	0	0	0	0	0	0	0		0			0	
N-5655	8/17/1993	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-5655	11/9/1993	8	1	3	0	0	0		2	0	0	0	0	0	0	0	0		0			0	
N-5655	2/15/1994	8	1	3	0	0	0		2	0	0	0	0	0	0	0	0		0			0	
N-5655	5/3/1994	5	0	3	0	0	0		2	0	0	0	0	0	0	0	0		0			0	
N-5655	6/7/1994	7	1	3	0	0	0		2	0	0	0	0	0	0	0	0		0			0	
N-5655	8/23/1994	11	1	5	0	0	0		3	0	0	0	0	0	0	0	0		0			0	
N-5655	11/29/1994	9	1	4	0	0	1		2	0	0	0	0	0	0	0	0		0			0	

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
N-5655	2/14/1995	9	1	4	0	0	0		2	0	0	0	0	0	0	0	0		0			0	
N-5655	5/16/1995	7	1	4	0	0	0		2	0	0	0	0	0	0	0	0		0			0	
N-5655	8/22/1995	8	1	5	0	0	0		2	0	0	0	0	0	0	0	0		0			0	
N-6819	4/5/1977	0	0	0					0			0			0	0							
N-6819	2/15/1978	0	0	0					0			0											
N-6819	9/28/1978	12	1	1	0	0	0		4	0	0	0										0	
N-6819	7/26/1979	17	2	1	0	0	1		5	0	0											0	
N-6819	7/24/1980	17	3	1		1	0		4	0	0											0	
N-6819	12/29/1980	13	4	0					5			0			0	0							
N-6819	5/22/1981	17		0	1		1		4		0	1	0									0	
N-6819	6/11/1981	12	4	0					5			0											
N-6819	6/4/1982	5		0	0	0	0		0	0	0	0	0									0	
N-6819	11/5/1982	7	5	1					1			0			0	0	0						
N-6819	3/4/1983	16	9	1			1		4		0	0			0	0	0					0	
N-6819	7/21/1983	3		1	0	0	0		0	0	0	0	0									0	
N-6819	9/8/1983	12	5	3			1		2		0	0			0	0	0					0	
N-6819	5/24/1984	0	0	0	0	0	0		0	0	0	0	0									0	
N-6819	2/27/1985	3	0	0		0	0		2	0		0			0	0	0					0	
N-6819	8/7/1985	0	0	0	0	0	0		0	0	0	0	0									0	
N-6819	4/30/1986	4		0	0	0	0		0	0	0		0									0	
N-6819	5/13/1987	0	0	0	0	0	0		0	0	0	0	0	0								0	
N-6819	6/23/1987	17	5	1	0	0	0		10	0		0			0	0	0					0	
N-6819	9/2/1987	34	7	1	0	0	6		9	0	0		0	0	0	0	0		0			0	
N-6819	3/2/1988	6		0	0	0	0		0	0	0	4	0	0	0	0	0		0			0	
N-6819	5/11/1988	14	3	0	0	0	1		6	0	0	0	0	0	0	0	0		0			2	
N-6819	8/11/1988	6		1	0	0	0		0		0		0	0	0	0	0		0			0	
N-6819	11/8/1988	2	1	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-6848	7/23/1990	9	1	1	0	0	1	0	1	0	0	0	0		0	0	0					0	
N-8497	4/5/1977	0	0	0					0			0											
N-8497	1/24/1978	0	0	0					0			0											
N-8497	9/20/1978	0	0	0	0	0	0		0	0	0	0										0	
N-8497	2/26/1979	0	0	0					0			0			0	0							
N-8497	7/26/1979	0	0	0	0	0	0		0	0	0											0	
N-8497	7/17/1980	0	0	0	0	0	0		0	0	0	0										0	

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
N-8497	8/5/1980	0													0	0							
N-8497	5/28/1981	0																					
N-8497	6/11/1981	0	0	0					0			0											
N-8497	1/27/1982	0	0	0		0	0		0	0	0	0			0	0	0					0	
N-8497	6/9/1982	0	0	0	0	0	0		0	0	0	0	0									0	
N-8497	2/16/1983	0	0	0			0		0		0	0			0	0	0					0	
N-8497	5/17/1984	0	0	0	0	0	0		0	0	0	0	0									0	
N-8497	11/26/1984	0	0	0			0		0	0		0			0	0	0					0	
N-8497	5/20/1985	0	0	0			0		0	0		0			0	0	0					0	
N-8497	8/21/1985	0	0	0	0	0	0		0	0	0	0	0									0	
N-8497	5/8/1986	0	0	0	0	0	0		0	0	0	0	0									0	
N-8497	7/7/1986	0	0	0	0	0	0		0	0		0			0	0	0					0	
N-8497	4/8/1987	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0					0	
N-8497	3/2/1988	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	5/11/1988	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	8/11/1988	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	11/8/1988	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	2/8/1989	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	5/10/1989	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	8/9/1989	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	11/21/1989	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	2/14/1990	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	5/22/1990	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	6/12/1990	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	7/25/1990	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0					0	
N-8497	8/7/1990	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	8/24/1990	0	0	0	0	0	0						0		0	0	0						
N-8497	2/19/1991	1	0	0	0	0	0		0	0	0	1	0	0	0	0	0		0			0	
N-8497	2/26/1991	0	0	0	0	0	0		0	0	0	0	0		0	0	0		0			0	
N-8497	5/14/1991	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	5/28/1991	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	8/5/1991	0	0	0	0	0	0		0	0	0	0	0		0	0	0		0			0	
N-8497	8/20/1991	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	11/20/1991	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.
(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
N/A - Not applicable.
GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
N-8497	2/11/1992	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	5/5/1992	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	8/11/1992	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	11/17/1992	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	2/2/1993	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	4/27/1993	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	8/17/1993	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	11/9/1993	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	2/15/1994	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	5/3/1994	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	6/7/1994	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	8/23/1994	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	11/29/1994	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	2/14/1995	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	5/16/1995	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	8/22/1995	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	11/21/1995	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	2/20/1996	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	5/14/1996	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	8/19/1996	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	11/19/1996	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	2/4/1997	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	3/20/1997	0																					
N-8497	5/9/1997	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	8/5/1997	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	11/4/1997	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	2/10/1998	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	5/5/1998	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	8/3/1998	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8497	11/3/1998	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8956	10/6/1977	0	0	0					0			0											
N-8956	12/7/1977	0	0	0					0			0											
N-8956	5/10/1978	0	0	0					0			0											
N-8956	10/31/1978	0	0	0	0	0	0		0	0	0	0										0	

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
N-8956	2/13/1979	0													0	0							
N-8956	6/19/1979	0													0	0							
N-8956	8/9/1979	0	0	0					0			0											
N-8956	9/20/1979	0													0	0							
N-8956	3/13/1980	0	0	0					0			0											
N-8956	6/18/1980	0													0	0							
N-8956	2/9/1981	0	0	0					0			0											
N-8956	4/24/1981	0													0	0							
N-8956	8/4/1981	0	0	0					0			0											
N-8956	2/3/1982	0													0	0	0						
N-8956	2/4/1982	0	0	0					0			0											
N-8956	2/25/1982	0	0	0					0		0	0											
N-8956	3/31/1982	0													0	0							
N-8956	4/15/1983	0	0	0					0		0	0											
N-8956	5/5/1983	1	0	1			0		0		0	0			0	0	0					0	
N-8956	8/1/1983	0	0	0			0		0		0	0			0	0	0					0	
N-8956	8/11/1983	0	0	0	0	0	0		0	0	0	0			0	0	0					0	
N-8956	9/19/1983	3	0	3			0		0		0	0			0	0	0					0	
N-8956	12/20/1983	0													0	0	0						
N-8956	1/24/1984	0	0	0			0		0	0		0			0	0	0					0	
N-8956	3/2/1984	0	0	0	0				0		0	0											
N-8956	12/11/1984	0													0	0	0						
N-8956	2/21/1985	0	0	0	0				0		0	0											
N-8956	4/11/1985	0	0	0			0		0	0		0			0	0	0					0	
N-8956	10/23/1985	0													0	0	0						
N-8956	4/14/1986	0	0	0	0	0	0		0	0		0			0		0					0	
N-8956	11/14/1986	2	0	2	0				0		0	0			0	0	0						
N-8956	2/9/1987	1	0	1	0	0	0		0	0		0			0	0	0					0	
N-8956	9/10/1987	1	0	1	0	0	0		0	0		0			0	0	0					0	
N-8956	10/30/1987	2	0	2	0				0		0	0			0	0	0		0				
N-8956	11/24/1987	1	0	1	0	0	0		0	0	0	0	0	0								0	
N-8956	12/22/1987	0	0	0	0	0	0		0	0	0	0	0	0								0	
N-8956	1/1/1988	3	1	1			0	0	0	0	0	1	0	0								0	
N-8956	1/22/1988	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

R2-0001110

Table 5.2
New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
N-8956	2/25/1988	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8956	3/24/1988	0													0	0	0		0				
N-8956	4/1/1988	3	1	2			0	0	0	0	0	0	0	0								0	
N-8956	4/26/1988	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8956	5/30/1988	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8956	6/9/1988	0													0	0	0		0				
N-8956	6/29/1988	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8956	6/30/1988	1	0	1	0	0	0		0	0	0	0	0	0								0	
N-8956	7/27/1988	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8956	8/29/1988	1	0	1	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8956	9/1/1988	1	0	1			0	0	0	0	0	0	0	0								0	
N-8956	9/21/1988	3		2	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8956	10/27/1988	5		2	0	0	0		2	0	0	1	0	0	0	0	0		0			0	
N-8956	11/30/1988	2		1	0	0	0		0	0	0	1	0	0	0	0	0		0			0	
N-8956	12/1/1988	2	0	2			0	0	0	0	0	0	0	0								0	
N-8956	12/27/1988	2		1	0	0	0		0	0	0	1	0	0	0	0	0		0			0	
N-8956	12/28/1988	2		1	0	0	0		0	0	0	1	0	0	0	0	0		0			0	
N-8956	1/1/1989	4	1	2			0	0	0	0	0	1	0	0								0	
N-8956	3/20/1989	2		2	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8956	4/1/1989	3	1	1			0	0	0	0	0	1	0	0								0	
N-8956	6/8/1989	3	1	1	0	0	0		0	0	0	1	0	0	0	0	0		0			0	
N-8956	8/29/1989	10	1	0	0	0	0		0	0	0	4	0	0	0	0	0		0			0	
N-8956	9/1/1989	14	1	0			0	0	0	0	0	4	0	0								0	
N-8956	11/10/1989	1	1	1	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8956	12/1/1989	1	1	1			0	0	0	0	0	0	0	0								0	
N-8956	1/1/1990	1	1	0			0	0	0	0	0	0	0	0								0	
N-8956	1/31/1990	1	1	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8956	4/1/1990	1	1	0			0	0	0	0	0	0	0	0								0	
N-8956	5/30/1990	2	1	0	0	0	0	0	0	0	0	1	0		0	0	0					0	
N-8956	6/26/1990	1	1	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8956	7/5/1990	3	1	1	0	0	0		0	0	0	1	0	0	0	0	0		0			0	
N-8956	7/10/1990	3	1	0	0	0	0		1	0	0	1	0		0	0	0					0	
N-8956	9/1/1990	3	1	1			0	0	0	0	0	1	0	0								0	
N-8956	12/1/1990	0	0	0			0	0	0	0	0	0	0	0								0	

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Tuesday, May 02, 2000

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
N-8956	12/10/1990	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8956	12/14/1990	1	1	0	0	0	0		0	0	0	0	0		0	0	0		0			0	
N-8956	1/1/1991	2	0	2			0	0	0	0	0	0	0	0								0	
N-8956	3/14/1991	4	2	2	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8956	4/1/1991	4	2	0			1	0	1	0	0	0	0	0								0	
N-8956	4/4/1991	4	1	2	0	0	0	0	1	0	0	0	0		0	0	0	0				0	
N-8956	6/11/1991	5	2	1	0	0	1		1	0	0	1	0	0	0	0	0		0			0	
N-8956	9/1/1991	5	0	4			0	0	1	0	0	0	0	0								0	
N-8956	9/11/1991	5	0	4	0	0	0		1	0	0	0	0	0	0	0	0		0			0	
N-8956	12/1/1991	3	1	0			0	0	0	0	0	0	0	0								0	
N-8956	12/3/1991	3	1	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8956	1/1/1992	3	1	2			0	0	0	0	0	0	0	0								0	
N-8956	3/9/1992	3	1	2	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8956	4/1/1992	20	2	13			2	0	0	0	0	0	0	0								0	
N-8956	6/11/1992	20	2	13		0	2		2	0	0	1	0	0	0	0	0		0			0	
N-8956	8/14/1992	6	1	2	0	0	2		1	0	0	0	0		0	0	0		0			0	
N-8956	9/1/1992	3	1	2			0	0	0	0	0	0	0	0								0	
N-8956	9/3/1992	3	1	2	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8956	12/1/1992	4	0	0			0	0	0	0	0	0	0	0								0	
N-8956	12/2/1992	4	0	0	0	0	0		0	0	0	1	0	0	0	0	0		0			0	
N-8956	1/1/1993	2	0	0			1	0	0	0	0	1	0	0								0	
N-8956	2/11/1993	2	0	0	0	0	0		0	0	0	1	0	0	0	0	0		0			0	
N-8956	2/16/1993	11	0	10	0	0	1		0	0	0	1	0	0	0	0	0		0			0	
N-8956	4/1/1993	7	1	3			1	0	1	0	0	1	0	0								0	
N-8956	5/11/1993	6	1	1	0	0	0		1	0	0	1	0	0	0	0	0		0			0	
N-8956	6/9/1993	6	1	3	0	0	1		1	0	0	1	0	0	0	0	0		0			0	
N-8956	9/1/1993	3	1	1	0	0	0	0	1	0	0	1	0	0	0	0	0		0			0	
N-8956	10/13/1993	8	4	1		0	0		2	0	0	1	0	0	0	0	0		0			0	
N-8956	12/1/1993	0	0	0			0	0	0	0	0	0	0	0								0	
N-8956	1/1/1994	11	3	0			0	0	0	0	3	1	0	0								0	
N-8956	3/17/1994	11	3	3	0	0	0		0	0	0	1	0	0	0	0	0		0			0	
N-8956	4/1/1994	15	3	3			2	0	4	0	0	1	0	0								0	
N-8956	4/5/1994	13	3	2		0	2		3	0	0	2	0	0	0	0	0		0			0	
N-8956	5/23/1994	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

Table 5.2
New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
N-8956	6/8/1994	14	3	3		0	2		4	0	0	1	0	0	0	0	0		0			0	
N-8956	6/16/1994	16	3	7		0	2		3	0	0	1	0	0	0	0	0		0			0	
N-8956	7/25/1994	19	5	3		0	3		5	0	1	2	0	0	0	0	0		0			0	
N-8956	8/17/1994	24	6	6		0	3		5	0	1	2	0	0	0	0	0		0			0	
N-8956	8/24/1994	10	4	2		0	1		2	0	0	1	0	0	0	0	0		0			0	
N-8956	9/1/1994	12	4	2			0	0	2	0	0	2	0	0								0	
N-8956	9/20/1994	22	4	6		0	3		5	0	0	2	0	0	0	0	0		0			0	
N-8956	10/24/1994	24	4	9		0	3		5	0	0	2	0	0	0	0	0		0			0	
N-8956	11/15/1994	22	3	9		0	3		5	0	0	1	0	0	0	0	0		0			0	
N-8956	12/1/1994	27	3	11			3	0	5	0	0	2	0	0								0	
N-8956	12/6/1994	27	3	11	0	0	3		5	0	0	2	0	0	0	0	0		0			0	
N-8956	12/22/1994	26	6	6		0	3		6	0	1	2	0	0	0	0	0		0			0	
N-8956	1/1/1995	36	4	17			3	0	6	0	0	2	0	0								0	
N-8956	1/20/1995	8	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8956	2/24/1995	24	6	5		0	3		6	0	1	2	0	0	0	0	0		0			0	
N-8956	3/24/1995	34	4	17		0	3		6	0	0	2	0	0	0	0	0		0			0	
N-8956	3/28/1995	31	4	15		0	3		5	0	0	2	0	0	0	0	0		0			0	
N-8956	4/1/1995	44	4	26			3	0	6	0	1	2	0	0								0	
N-8956	4/27/1995	28	6	6		0	4		7	0	1	3	0	0	0	0	0		0			0	
N-8956	5/22/1995	39	5	14		0	6		9	0	0	3	0	0	0	0	0		0			0	
N-8956	6/12/1995	43	4	26		0	3		6	0	1	2	0	0	0	0	0		0			0	
N-8956	6/29/1995	44	5	26		0	3		6	0	1	2	0	0	0	0	0		0			0	
N-8956	7/20/1995	41	4	26		0	3		5	0	0	1	0	0	0	0	0		0			0	
N-8956	8/24/1995	46	4	30		0	3		5	0	1	1	0	0	0	0	0		0			0	
N-8956	9/1/1995	21	5	4			2	0	4	1	0	2	0	0								0	
N-8956	9/15/1995	18	5	4		0	2		4	0	0	2	0	0	0	0	0		0			0	
N-8956	9/21/1995	24	5	5	0	0	3		6	0	1	2	0	0	0	0	0		0			0	
N-8956	10/26/1995	8	2	1	0	0	1		1	0	0	1	0	0	0	0	0		0			0	
N-8956	10/30/1995	1	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8956	12/1/1995	1	0	0			0	0	0	0	0	0	0	0								0	
N-8956	1/1/1996	9	4	1			1	0	2	0	0	0	0	0								0	
N-8956	3/11/1996	17	0	0	0	0	0		0	0	0	1	0	0	0	0	0		0			0	
N-8956	3/26/1996	8	4	1		0	1		2	0	0	0	0	0	0	0	0		0			0	
N-8956	4/1/1996	45	4	26			3	0	5	0	1	2	0	0								0	

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.
(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
N/A - Not applicable.
GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
N-8956	5/17/1996	39	2	21	1	0	5		5	0	0	2	0	0	0	0	0		0			0	
N-8956	6/20/1996	44	4	26		0	3		5	0	1	2	0	0	0	0	0		0			0	
N-8956	7/26/1996	41	5	18		0	4		7	0	1	2	0	0	0	0	0		0			0	
N-8956	8/8/1996	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8956	8/28/1996	42	3	21	1	0	5		6	0	1	2	0	0	0	0	0		0			0	
N-8956	9/1/1996	52	7	23			4	0	8	0	0	3	0	0								0	
N-8956	9/19/1996	50	6	23		0	4		8	0	1	3	0	0	0	0	0		0			0	
N-8956	11/21/1996	44	4	26		0	3		6	0	0	2	0	0	0	0	0		0			0	
N-8956	12/1/1996	46	4	26			3	0	6	0	0	2	0	0								0	
N-8956	12/12/1996	33	5	12		0	5		7	0	0	0	0	0	0	0	0		0			0	
N-8956	1/1/1997	27	4	12			2	0	4	0	0	2	0	0								0	
N-8956	1/16/1997	29	4	12	2	0	2		4	0	0	2	0	0	0	0	0		0			0	
N-8956	2/14/1997	24	1	22	0	0	0		1	0	0	0	0	0	0	0	0		0			0	
N-8956	3/31/1997	8	3	1	1	0	0		1	0	0	1	0	0	0	0	0		0			0	
N-8956	4/1/1997	39	6	8			6	0	9	0	1	3	0	0								0	
N-8956	4/5/1997	23	1	21			1			0	0	0	0	0	0	0	0		0			0	
N-8956	4/24/1997	4	2	1			1		1	0	0	0	0	0	0	0	0		0			0	
N-8956	5/29/1997	24	1	21			1		1	0	0	0	0	0	0	0	0		0			0	
N-8956	6/17/1997	41	6	8	2	0	6		9	0	1	3	0	0	0	0	0		0			0	
N-8956	6/27/1997	45	5	10	2	0	7		10	0	1	3	0	0	0	0	0		0			0	
N-8956	7/17/1997	40	6	9			7		9	0	1	3	0	0	0	0	0		0			0	
N-8956	8/13/1997	44	5	18			6		8	0	1	0	0	0	0	0	0		0			0	
N-8956	9/1/1997	54	5	27			5	0	8	0	0	3	0	0								0	
N-8956	9/2/1997	54	5	27			5		8	0	0	3	0	0	0	0	0		0			0	
N-8956	10/16/1997	74	9	24			10		14	0	2	5	0	0	0	0	0		0			0	
N-8956	11/14/1997	65	6	32			7		9	0	1	3	0	0	0	0	0		0			0	
N-8956	12/1/1997	100	6	62			6	0	15	0	1	2	0	0	0	0	0		0			0	
N-8956	1/1/1998	32	5	5			5	0	8	0	1	0	0	0								0	
N-8956	1/12/1998	25	4	9	0		2		6	0	0	0	0	0	0	0	0		0			0	
N-8956	1/30/1998	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8956	2/5/1998	29	5	6			4		7	0	1	3	0	0	0	0	0		0			0	
N-8956	3/13/1998	1	0	1	0		0		0	0	0	0	0	0	0	0	0		0			0	
N-8956	3/21/1998	32	5	5	0		5		8	0	1	3	0	0	0	0	0		0			0	
N-8956	4/1/1998	49	6	13			7	0	10	0	1	3	0	0								0	

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

Table 5.2
New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
N-8956	4/22/1998	38	4	22	1		3		4	0	0	2	0	0	0	0	0		0			0	
N-8956	5/7/1998	17	4	2	1		2		4	0	1	2	0	0	0	0	0		0			0	
N-8956	6/19/1998	45	6	13	1		7		10	0	1	3	0	0	0	0	0		0			0	
N-8956	7/23/1998	63	6	31	1		7		8	0	1	3	0	0	0	0	0		0			0	
N-8956	8/13/1998	63	5	35	1		6		7	0	1	2	0	0	0	0	0		0			0	
N-8956	9/1/1998	66	6	31			7	1	8	0	1	3	0	0								0	
N-8956	9/9/1998	66	6	31	1		7		8	0	1	3	0	0	0	0	0		0			0	
N-8956	9/17/1998	84	10	41	1	0	11		10	0	1	3	0	0	0	0	0		0			0	
N-8956	10/1/1998	0																					
N-8956	10/8/1998	58	6	23	1		8		9	0	1	3	0	0	0	0	0		0			0	
N-8956	10/16/1998	49	6	18	1		6		7	0	1	3	0	0	0	0	0		0			0	
N-8956	10/23/1998	53	5	19	1		8		8	0	2	3	0	0	0	0	0		0			0	
N-8956	11/23/1998	69	6	32	1		8		9	0	1	3	0	0	0	0	0		0			0	
N-8956	12/1/1998	58	6	23			8	1	9	0	1	3	0	0								0	
N-8956	12/28/1998	55	6	20	1		6		9	0	1	3	0	0	0	0	0		0			0	
N-8956	1/1/1999	65	7	30			6	1	8	0	1	3	0	0								0	
N-8957	10/6/1977	0	0	0					0			0											
N-8957	12/2/1977	0	0	0					0			0											
N-8957	5/3/1978	0	0	0					0	0		0											
N-8957	11/1/1978	0	0	0	0	0	0		0	0	0	0										0	
N-8957	1/8/1979	0													0	0							
N-8957	2/5/1979	0													0	0							
N-8957	6/19/1979	0													0	0							
N-8957	8/9/1979	0	0	0					0			0											
N-8957	9/20/1979	0													0	0							
N-8957	3/13/1980	0	0	0					0			0											
N-8957	6/18/1980	0													0	0							
N-8957	2/9/1981	0	0	0					0			0											
N-8957	4/24/1981	0													0	0							
N-8957	7/24/1981	0	0	0					0			0											
N-8957	11/25/1981	0													0	0	0						
N-8957	2/25/1982	0	0	0					0		0	0											
N-8957	3/15/1982	0													0	0							
N-8957	4/15/1983	0	0	0					0		0	0											

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.
(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
N/A - Not applicable.
GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
N-8957	5/5/1983	0	0	0					0			0											
N-8957	8/1/1983	0	0	0			0		0		0	0			0	0	0					0	
N-8957	8/11/1983	0	0	0	0	0	0		0	0	0	0			0	0	0					0	
N-8957	9/22/1983	1	0	1			0		0		0	0			0	0	0					0	
N-8957	12/20/1983	3													0	3	0						
N-8957	3/2/1984	0	0	0	0				0		0	0											
N-8957	7/18/1984	0	0	0			0		0	0		0			0	0	0					0	
N-8957	12/11/1984	0													0	0	0						
N-8957	1/28/1985	1	0	0	0				0		1	0											
N-8957	2/6/1985	0	0	0		0	0		0	0		0			0	0	0					0	
N-8957	10/23/1985	0													0	0	0						
N-8957	1/29/1986	0	0	0	0	0	0		0	0		0			0	0	0					0	
N-8957	12/4/1986	0	0	0	0				0		0	0			0	0	0						
N-8957	1/30/1987	0	0	0	0	0	0		0	0		0			0	0	0					0	
N-8957	9/10/1987	0	0	0	0	0	0		0	0		0			0	0	0					0	
N-8957	10/30/1987	0	0	0	0				0		0	0			0	0	0		0				
N-8957	11/24/1987	0	0	0	0	0	0		0	0	0	0	0	0								0	
N-8957	12/22/1987	0	0	0	0	0	0		0	0	0	0	0	0								0	
N-8957	1/1/1988	1	0	1			0	0	0	0	0	0	0	0								0	
N-8957	1/22/1988	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	2/25/1988	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	3/31/1988	0													0	0	0		0				
N-8957	4/1/1988	0	0	0			0	0	0	0	0	0	0	0								0	
N-8957	4/26/1988	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	5/10/1988	0	0	0	0	0	0		0	0		0			0	0	0					0	
N-8957	6/6/1988	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	6/9/1988	0													0	0	0		0				
N-8957	6/29/1988	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	6/30/1988	0	0	0	0	0	0		0	0	0	0	0	0								0	
N-8957	7/27/1988	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	8/29/1988	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	9/1/1988	0	0	0			0	0	0	0	0	0	0	0								0	
N-8957	9/21/1988	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	10/27/1988	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
N-8957	11/30/1988	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	12/1/1988	0	0	0			0	0	0	0	0	0	0	0								0	
N-8957	12/28/1988	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	1/1/1989	3	1	2			0	0	0	0	0	0	0	0								0	
N-8957	3/22/1989	2		2	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	4/1/1989	2	0	2			0	0	0	0	0	0	0	0								0	
N-8957	4/6/1989	2	0	2	0	0	0		0			0			0	0	0						
N-8957	6/8/1989	2	0	2	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	8/29/1989	1	0	1	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	9/1/1989	2	1	1			0	0	0	0	0	0	0	0								0	
N-8957	11/10/1989	1	0	1	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	12/1/1989	1	0	1			0	0	0	0	0	0	0	0								0	
N-8957	1/1/1990	0	0	0			0	0	0	0	0	0	0	0								0	
N-8957	2/14/1990	1	0	1	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	3/26/1990	2	0	0	0	0	0		0	0	0	2	0		0	0	0					0	
N-8957	4/1/1990	1	0	1			0	0	0	0	0	0	0	0								0	
N-8957	5/30/1990	1	0	0	0	0	0	0	1	0	0	0	0		0	0	0					0	
N-8957	6/27/1990	1	0	1	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	7/5/1990	1	0	1	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	9/1/1990	1	0	1			0	0	0	0	0	0	0	0								0	
N-8957	12/1/1990	0	0	0			0	0	0	0	0	0	0	0								0	
N-8957	12/11/1990	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	12/14/1990	0	0	0	0	0	0		0	0	0	0	0		0	0	0		0			0	
N-8957	1/1/1991	2	0	2			0	0	0	0	0	0	0	0								0	
N-8957	1/23/1991	2	0	2	0	0	0		0	0	0	0	0		0	0	0		0			0	
N-8957	3/14/1991	2	0	2	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	4/1/1991	2	0	2			0	0	0	0	0	0	0	0								0	
N-8957	4/4/1991	3	0	2	0	0	0	0	1	0	0	0	0		0	0	0	0	0			0	
N-8957	6/11/1991	2	0	2	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	9/1/1991	4	0	4			0	0	0	0	0	0	0	0								0	
N-8957	9/11/1991	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	12/1/1991	2	1	0			0	0	0	0	0	0	0	0								0	
N-8957	12/3/1991	2	1	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	1/1/1992	7	1	6			0	0	0	0	0	0	0	0								0	

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.
(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
N/A - Not applicable.
GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
N-8957	3/9/1992	7	1	6	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	4/1/1992	1	0	1			0	0	0	0	0	0	0	0								0	
N-8957	6/11/1992	1	0	1	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	9/1/1992	9	0	9			0	0	0	0	0	0	0	0								0	
N-8957	9/3/1992	9	0	9	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	9/8/1992	9	1	8	0	0	0		1	0	0	0	0	0								0	
N-8957	12/1/1992	1	0	0			0	0	0	0	0	0	0	0								0	
N-8957	1/1/1993	11	1	0			0	0	0	0	10	1	0	0								0	
N-8957	4/1/1993	11	1	8			1	0	1	0	0	0	0	0								0	
N-8957	5/11/1993	4	0	4	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	6/9/1993	11	1	8	0	0	1		1	0	0	0	0	0	0	0	0		0			0	
N-8957	9/1/1993	9	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0		0			0	
N-8957	10/13/1993	15	1	13	0	0	0		1	0	0	0	0	0	0	0	0		0			0	
N-8957	12/1/1993	0	0	0			0	0	0	0	0	0	0	0								0	
N-8957	1/1/1994	9	0	0			0	0	1	0	8	0	0	0								0	
N-8957	3/17/1994	9	0	8	0	0	0		1	0	0	0	0	0	0	0	0		0			0	
N-8957	4/1/1994	5	1	4			0	0	0	0	0	0	0	0								0	
N-8957	4/5/1994	12	0	10		0	1		1	0	0	0	0	0	0	0	0		0			0	
N-8957	5/23/1994	15	1	13	0	0	0		1	0	0	0	0	0	0	0	0		0			0	
N-8957	6/8/1994	4	0	4	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	6/16/1994	14	1	12	0	0	0		1	0	0	0	0	0	0	0	0		0			0	
N-8957	7/25/1994	16	1	14	0	0	0		1	0	0	0	0	0	0	0	0		0			0	
N-8957	8/17/1994	24	2	20		0	1		1	0	0	0	0	0	0	0	0		0			0	
N-8957	8/24/1994	15	1	13	0	0	0		1	0	0	0	0	0	0	0	0		0			0	
N-8957	9/1/1994	15	1	13			0	0	1	0	0	0	0	0								0	
N-8957	9/20/1994	19	1	16	0	0	1		1	0	0	0	0	0	0	0	0		0			0	
N-8957	10/24/1994	21	1	18		0	1		1	0	0	0	0	0	0	0	0		0			0	
N-8957	11/15/1994	8	0	8	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	12/1/1994	7	0	7			0	0	0	0	0	0	0	0								0	
N-8957	12/6/1994	7	0	7	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	12/22/1994	26	1	23	0	0	1		1	0	0	0	0	0	0	0	0		0			0	
N-8957	1/1/1995	9	0	9			0	0	0	0	0	0	0	0								0	
N-8957	1/20/1995	37	4	23		0	3		5	0	0	1	0	0	0	0	0		0			0	
N-8957	2/24/1995	31	1	28		0	1		1	0	0	0	0	0	0	0	0		0			0	

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

Table 5.2
New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
N-8957	3/24/1995	9	0	9	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	3/28/1995	21	1	19	0	0	0		1	0	0	0	0	0	0	0	0		0			0	
N-8957	4/1/1995	9	0	9			0	0	0	0	0	0	0	0								0	
N-8957	4/27/1995	25	1	22		0	1		1	0	0	0	0	0	0	0	0		0			0	
N-8957	5/16/1995	26	1	22	1	0	1		1	0	0	0	0	0	0	0	0		0			0	
N-8957	5/22/1995	31	2	26		0	1		2	0	0	1	0	0	0	0	0		0			0	
N-8957	6/5/1995	27	1	21	0	0	2		3	0	0	0	0	0	0	0	0		0			0	
N-8957	6/12/1995	9	0	9	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	6/29/1995	19	1	16		0	1		1	0	0	0	0	0	0	0	0		0			0	
N-8957	7/20/1995	19	1	16		0	1		1	0	0	0	0	0	0	0	0		0			0	
N-8957	8/24/1995	20	1	17		0	1		1	0	0	0	0	0	0	0	0		0			0	
N-8957	9/1/1995	23	1	20			1	0	1	0	0	0	0	0								0	
N-8957	9/15/1995	23	1	20		0	1		1	0	0	0	0	0	0	0	0		0			0	
N-8957	9/21/1995	17	1	15	0	0	0		1	0	0	0	0	0	0	0	0		0			0	
N-8957	10/26/1995	16	1	15	0	0	0		1	0	0	0	0	0	0	0	0		0			0	
N-8957	10/30/1995	19	1	16	0	0	1		1	0	0	0	0	0	0	0	0		0			0	
N-8957	12/1/1995	19	1	16			1	0	1	0	0	0	0	0								0	
N-8957	1/1/1996	4	0	4			0	0	0	0	0	0	0	0								0	
N-8957	3/7/1996	4	0	4	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	3/11/1996	6	0	6	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	4/1/1996	15	2	12			0	0	1	0	0	0	0	0								0	
N-8957	6/20/1996	15	2	12		0	0		1	0	0	0	0	0	0	0	0		0			0	
N-8957	7/26/1996	21	1	18		0	1		1	0	0	0	0	0	0	0	0		0			0	
N-8957	8/8/1996	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	9/1/1996	26	2	21			1	0	1	0	0	0	0	0								0	
N-8957	9/19/1996	28	2	24		0	1		1	0	0	0	0	0	0	0	0		0			0	
N-8957	11/21/1996	10	0	10	0	0	0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	12/1/1996	10	0	10			0	0	0	0	0	0	0	0								0	
N-8957	12/12/1996	26	1	24	0	0	0		1	0	0	0	0	0	0	0	0		0			0	
N-8957	1/1/1997	28	1	24			1	0	1	0	0	1	0	0								0	
N-8957	1/16/1997	28	1	24	0	0	0		1	0	0	1	0	0	0	0	0		0			0	
N-8957	2/14/1997	24	1	22	0	0	0		1	0	0	0	0	0	0	0	0		0			0	
N-8957	3/31/1997	33	2	24	1	0	1		2	0	0	1	0	0	0	0	0		0			0	
N-8957	4/1/1997	23	1	21			0	0	0	0	0	0	0	0								0	

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.
(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
N/A - Not applicable.
GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
N-8957	4/24/1997	23	1	19			1		1	0	0	0	0	0	0	0	0		0			0	
N-8957	5/28/1997	26	1	23			1		1	0	0	0	0	0	0	0	0		0			0	
N-8957	6/12/1997	38	2	34	1		0		1	0	0	0	0	0	0	0	0		0			0	
N-8957	6/17/1997	23	1	21	0	0	0		1	0	0	0	0	0	0	0	0		0			0	
N-8957	6/24/1997	31	2	25	1	0	1		1	0	0	0	0	0	0	0	0		0			0	
N-8957	7/17/1997	31	2	27			1		1	0	0	0	0	0	0	0	0		0			0	
N-8957	8/13/1997	30	2	26			1		1	0	0	0	0	0	0	0	0		0			0	
N-8957	9/1/1997	25	2	20			1	0	1	0	0	0	0	0								0	
N-8957	9/2/1997	24	2	20			1		1	0	0	0	0	0	0	0	0		0			0	
N-8957	10/16/1997	33	3	28			1		1	0	0	0	0	0	0	0	0		0			0	
N-8957	11/14/1997	18	2	15			0		1	0	0	0	0	0	0	0	0		0			0	
N-8957	12/1/1997	15	0	15	0		0	0	0	0	0	0	0	0	0	0	0		0			0	
N-8957	1/1/1998	27	2	23			0	0	1	0	0	0	0	0								0	
N-8957	1/12/1998	18	2	14	0		0		1	0	0	0	0	0	0	0	0		0			0	
N-8957	2/5/1998	33	2	29	0		0		1	0	0	0	0	0	0	0	0		0			0	
N-8957	3/13/1998	37	2	33	0		0		1	0	0	0	0	0	0	0	0		0			0	
N-8957	3/22/1998	27	2	23	0		0		1	0	0	0	0	0	0	0	0		0			0	
N-8957	4/1/1998	27	2	23			0	0	1	0	0	0	0	0								0	
N-8957	4/23/1998	30	2	25	1		1		1	0	0	0	0	0	0	0	0		0			0	
N-8957	6/19/1998	27	2	23	1		0		1	0	0	0	0	0	0	0	0		0			0	
N-8957	7/23/1998	31	3	25	1		1		1	0	0	0	0	0	0	0	0		0			0	
N-8957	8/13/1998	25	2	20	1		1		1	0	0	0	0	0	0	0	0		0			0	
N-8957	9/1/1998	33	3	26			2	1	1	0	0	0	0	0								0	
N-8957	9/9/1998	33	3	26	1		2		1	0	0	0	0	0	0	0	0		0			0	
N-8957	10/1/1998	0																					
N-8957	10/8/1998	48	3	42	1		1		1	0	0	0	0	0	0	0	0		0			0	
N-8957	10/16/1998	34	3	30	0		1		1	0	0	0	0	0	0	0	0		0			0	
N-8957	10/23/1998	35	3	30	0		1		1	0	0	0	0	0	0	0	0		0			0	
N-8957	11/23/1998	17	1	14	1		1		0	0	0	0	0	0	0	0	0		0			0	
N-8957	12/1/1998	48	3	42			1	1	1	0	0	0	0	0								0	
N-8957	12/28/1998	11	1	10	1		0		0	0	0	0	0	0	0	0	0		0			0	
N-8957	1/1/1999	15	1	13			0	0	1	0	0	0	0	0								0	
N-8984	6/4/1990	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0					0	
N-9234	8/14/1990	562	380	23	77	2	3	77	0		0		0		0	0	0						

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.
(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
N/A - Not applicable.
GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
N-9235	8/14/1990	1,584	1,400	24	79	1	0	79					0		1	0	0						
N-9236	7/18/1990	215	210	3	1	0	0	1	0	0	0	0	0		0	0	0					0	
N-9239	8/16/1990	2	2	0	0	0	0	0					0		0	0	0						
N-9240	8/16/1990	7	3	1	0	0	3	0					0		0	0	0						
N-9241	8/16/1990	2	2	0	0	0	0	0					0		0	0	0						
N-9354	7/23/1990	3	1	0	0	0	0	0	2	0	0	0	0		0	0	0					0	
N-9917	7/17/1990	3	1	0	1	0	0	1	0	0	0	0	0		0	0	0					0	
N-9938	5/5/1982	2,133	3	292		43	456		1,174		0	4			0	0	0					0	
N-9938	2/4/1983	218	0	7			17		190	0	0	0			0	0	0					0	
N-9938	5/3/1984	1,533	22	300					1,200	0		0			0	0	0						
N-9938	3/1/1985	1,090	28	400		0			660	2		0			0	0	0						
N-9938	5/10/1985	1,078	42	360					610	2		0			0	0	0						
N-9938	12/23/1985	8,266	59	460					7,700	0		1			0	0	0						
N-9938	6/13/1990	3,756	290	170	2	0	1,700	2	1,300	11	51	93	55		0	0	0					2	
N-9938	4/10/1991	8,122	320	370	2	0	830	2	6,400	6	21	122	0		0	0	0	0	0			1	
N-9938	1/1/1993	868	73	60			76	0	620		10		0		0	0	0		0	0			
N-9938	11/30/1995	160	0	0	0	0	0		160		0		0		0	0	0		0	0		0	
N-9938	4/13/1999	230	0	12			21	0	170	0	0	0	0	0	0	0	0	0			0	0	0
N-9938	8/10/1999	430	14	29			39	0	300		0	0	0	0	0			0			0	0	
N-9939	6/4/1990	18	2	0	1	0	3	1	4	6	0	1	0		0	0	0					0	
N-9939	4/13/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
N-9939	8/10/1999	0	0	0			0	0	0		0	0	0	0	0			0			0	0	
NE HOPPER/MAIN	4/16/1999	199	0	69			0	130	0	0	0	0	0	0	0	0	0	0			0	0	0
NRMW-1	4/21/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
NRMW-1	8/10/1999	0	0	0			0	0	0		0	0	0	0	0			0			0	0	
NRMW-2	4/21/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
NRMW-2	8/10/1999	0	0	0			0	0	0		0	0	0	0	0			0			0	0	
NRMW-3	4/21/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
NRMW-3	8/10/1999	0	0	0			0	0	0		0	0	0	0	0			0			0	0	
NRMW-4	8/17/1999	0	0	0			0	0	0		0	0	0	0	0			0			0	0	
NYT MW-1	1/1/1993	19	15	4			0	0	0		0		0		0	0	0		0	0			
NYT MW-2	1/1/1993	15	0	0			0	5	4		0		0		0	0	0		0	0			
NYT MW-3	1/1/1993	2	2	0			0	0	0		0		0		0	0	0		0	0			
NYT MW-3	4/13/1999	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.
(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
N/A - Not applicable.
GV - Guidance Value

Table 5.2
New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
P-1 (55-)	1/1/1993	0	0	0	0	0	0		0		0		0		0	0	0		0	0			
P-2 (55-)	1/1/1993	0	0	0	0	0	0		0		0		0		0	0	0		0	0			
RG MW-1	8/18/1999	173	0	73			0	100	0		0	0	0	0	0			0			0	0	
SGB - 1 (52)	6/15/1999	5,597	14	190	0	0	460		3,100	0	0	1		12	0	0	0		0	0	0	0	0
SGB - 1 (62)	6/15/1999	3,108	27	350	0	0	300		1,800	2	0	0		9	0	0	0		0	0	0	0	0
SGB - 10 (52)	6/16/1999	2,783	12	17	4	0	290		2,100	0	0	0		17	0	0	0		0	0	3	0	0
SGB - 10 (62)	6/16/1999	2,809	12	26	6	0	330		2,000	0	0	0		22	3	15	0		0	4	0	0	0
SGB - 2 (52)	6/15/1999	3,522	2	120	0	0	280		1,900	0	0	2		18	0	0	0		0	0	0	0	0
SGB - 2 (62)	6/15/1999	10,160	0	0	0	0	760		7,400	0	0	0		0	0	0	0		0	0	0	0	0
SGB - 3 (52)	6/16/1999	594	0	0	0	0	48		490	0	0	0		0	0	0	0		0	0	0	0	0
SGB - 3 (62)	6/16/1999	813	0	0	0	0	87		640	0	0	0		0	0	0	0		0	0	0	0	0
SGB - 4 (52)	6/16/1999	319	0	2	0	0	57		260	0	0	0		0	0	0	0		0	0	0	0	0
SGB - 4 (62)	6/16/1999	127	0	0	0	0	12		85	0	0	0		0	0	0	0		0	0	0	0	0
SGB - 5 (52)	6/16/1999	2	0	0	0	0	0		2	0	0	0		0	0	0	0		0	0	0	0	0
SGB - 5 (62)	6/16/1999	0	0	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	0
SGB - 6 (52)	6/16/1999	341	0	4	0	0	11		230	0	0	0		0	0	0	0		0	0	4	0	0
SGB - 6 (62)	6/16/1999	305	0	6	0	0	13		220	0	0	0		0	0	0	0		0	0	4	0	0
SGB - 7 (52)	6/16/1999	560	0	0	0	0	31		370	0	0	0		2	3	31	7		0	8	4	0	0
SGB - 7 (62)	6/16/1999	619	0	2	0	0	50		500	0	0	0		3	0	6	0		0	3	5	0	0
SGB - 8 (52)	6/16/1999	1,640	0	1	0	0	130		1,300	0	0	1		8	0	0	0		0	0	0	0	0
SGB - 8 (62)	6/16/1999	2,208	0	0	0	0	180		1,700	0	0	0		15	0	0	0		0	0	3	0	0
SGB - 9 (52)	6/16/1999	588	0	2	0	0	31		420	0	0	0		3	0	0	0		0	0	12	0	0
SGB - 9 (62)	6/16/1999	1,109	0	7	0	0	110		890	0	0	0		7	0	0	0		0	0	0	0	0
TGP-1 (80)	11/17/1998	50	14	1			7	3	24	0	0			0								0	
TGP-1 (95)	11/17/1998	51	0	0			6	0	42	0	0			0								0	
TGP-2 (80)	11/18/1998	88	18	3			8	10	39	0	0			0								0	
TGP-2 (95)	11/18/1998	132	0	3			5	2	110	0	0			0								0	
TGP-3 (80)	11/18/1998	468	0	3			29	2	190	0	1			3								0	
TGP-3 (95)	11/18/1998	551	0	1			33	2	230	0	1			4								0	
TGP-4 (60)	11/18/1998	4,7'8	0	7			340	0	3,800	0	0			11								0	
TGP-4 (80)	11/18/1998	89	13	3			8	4	47	0	0			0								0	
TGP-4 (95)	11/18/1998	37	0	1			2	0	26	0	0			0								0	
TGPA-60	6/9/1999	26,620	0	0			3,130	0	0,90	0	0			0								0	
TGPA-80	6/9/1999	4,406	0	0			446	0	2,300	0	0			0								0	

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

Table 5.2

New Cassel Industrial Area Historical Groundwater Data Summary

Sample ID (ug/kg)	Date Sampled	Total VOCs	PCE	TCE	cis 1,2 DCE	trans 1,2 DCE	1,1 DCE	1,2 DCE (total)	1,1,1 TCA	1,1,2 TCA	1,2 DCA	Chloroform	Vinyl Chloride	Chloroethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	o-Xylene	m,p-Xylene	Acetone	Methylene Chloride	4 Methyl 2 Pentanone
	NYSDEC Class GA Standards (a)		5	5	5	5	5	5	5	1	0.6	7	2	5	1	5	5	5	5	5	50 GV	5	N/A
TGPB-60	6/9/1999	1,770	0	0			224	0	1,340	0	0			0								0	
TGPB-80	6/9/1999	3,446	0	0			437	0	2,700	0	0			0								0	
TGPB-95	6/9/1999	298	21	0			34	0	215	0	0			0								0	
TW-1 (51-63)	11/18/1998	16,460	0	0			880	0	5,00	0	0			0								0	
UN-10	1/1/1995	247	120	10			4	0	99	0	0	0	0	0	0	0	0	0			0	0	0
UN-11	1/1/1995	200	91	5			1	0	91	0	0	0	0	0	0	0	0	0			0	0	0
UN-16	4/13/1999	132	66	34			0	32	0	0	0	0	0	0	0	0	0	0			0	0	0
UN-16	8/16/1999	164	96	36			0	32	0		0	0	0	0	0			0			0	0	
UN-23	1/1/1995	425	74	340			0	8	3	0	0	0	0	0	0	0	0	0			0	0	0
UN-23	8/24/1999	32	21	11			0	0	0		0	0	0	0	0			0			0	0	
UN-24	1/1/1995	95	39	51			0	1	4	0	0	0	0	0	0	0	0	0			0	0	0
UN-25	1/1/1995	2	2	0			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0
UN-3	1/1/1995	9	2	0			0	0	7	0	0	0	0	0	0	0	0	0			0	0	0
UTILITY MW-2	1/1/1993	114	30	20			0	21	29		0		0		0	0	0		0	0			

Blank results denote sample was not analyzed for that compound. Zero results denote sample was analyzed but was reported as non-detect for that compound.

(a) - Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

N/A - Not applicable.

GV - Guidance Value

APPENDIX G

AREAS OF IMPACTED GROUNDWATER FOR VARIOUS YEARS

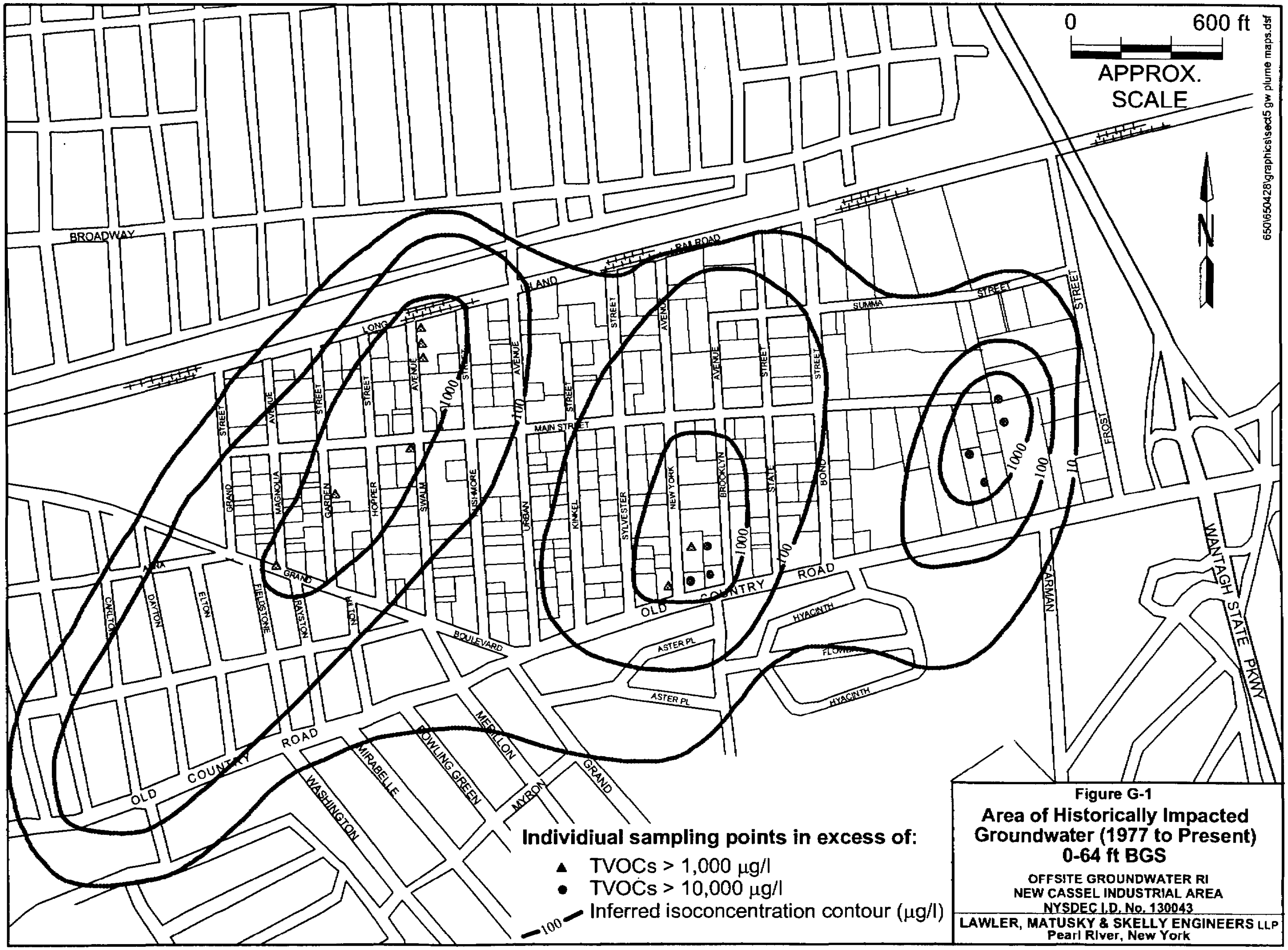


Figure G-1

Area of Historically Impacted Groundwater (1977 to Present) 0-64 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

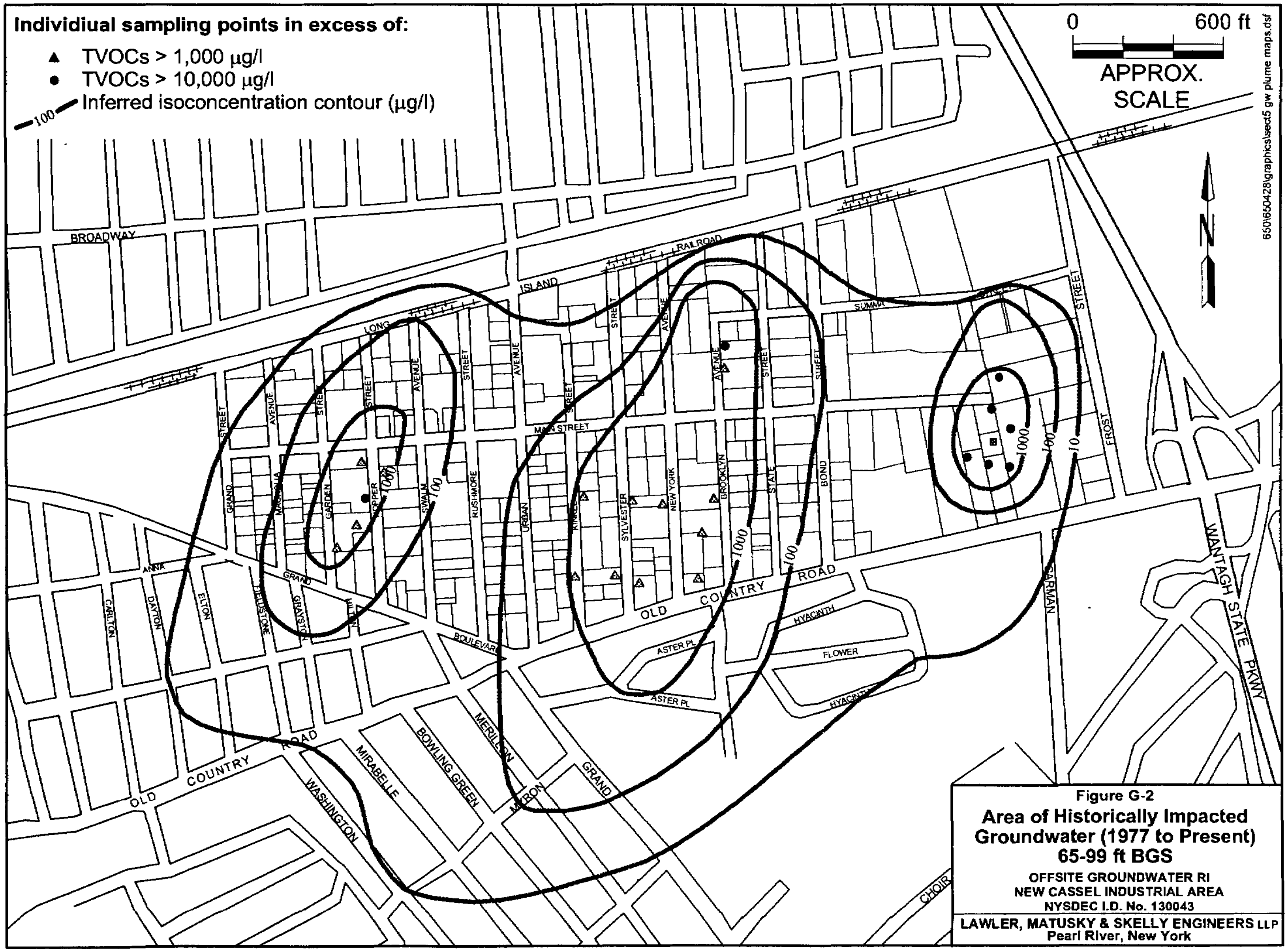


Figure G-2
Area of Historically Impacted Groundwater (1977 to Present) 65-99 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

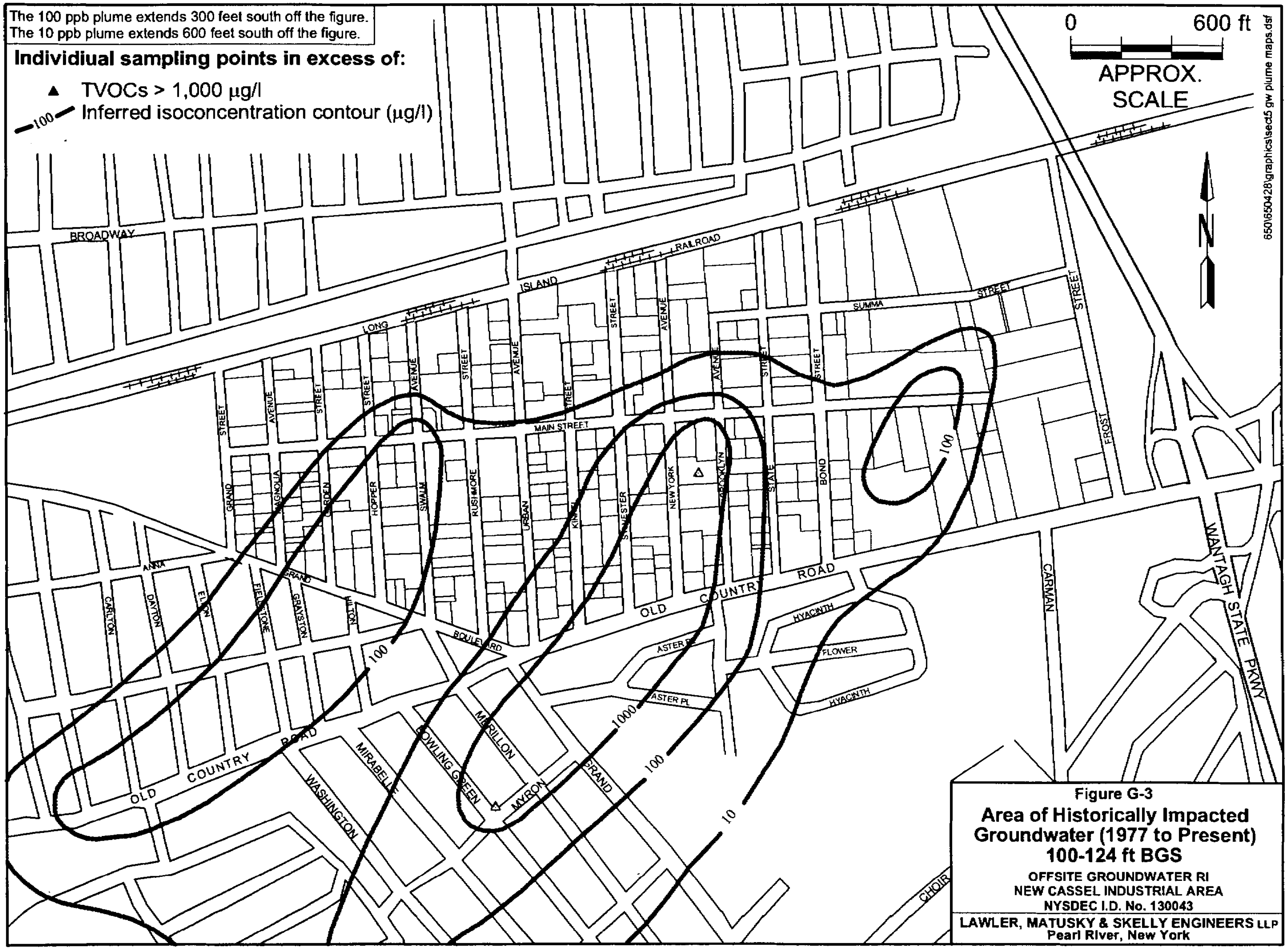


Figure G-3
Area of Historically Impacted Groundwater (1977 to Present)
100-124 ft BGS
OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043
LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

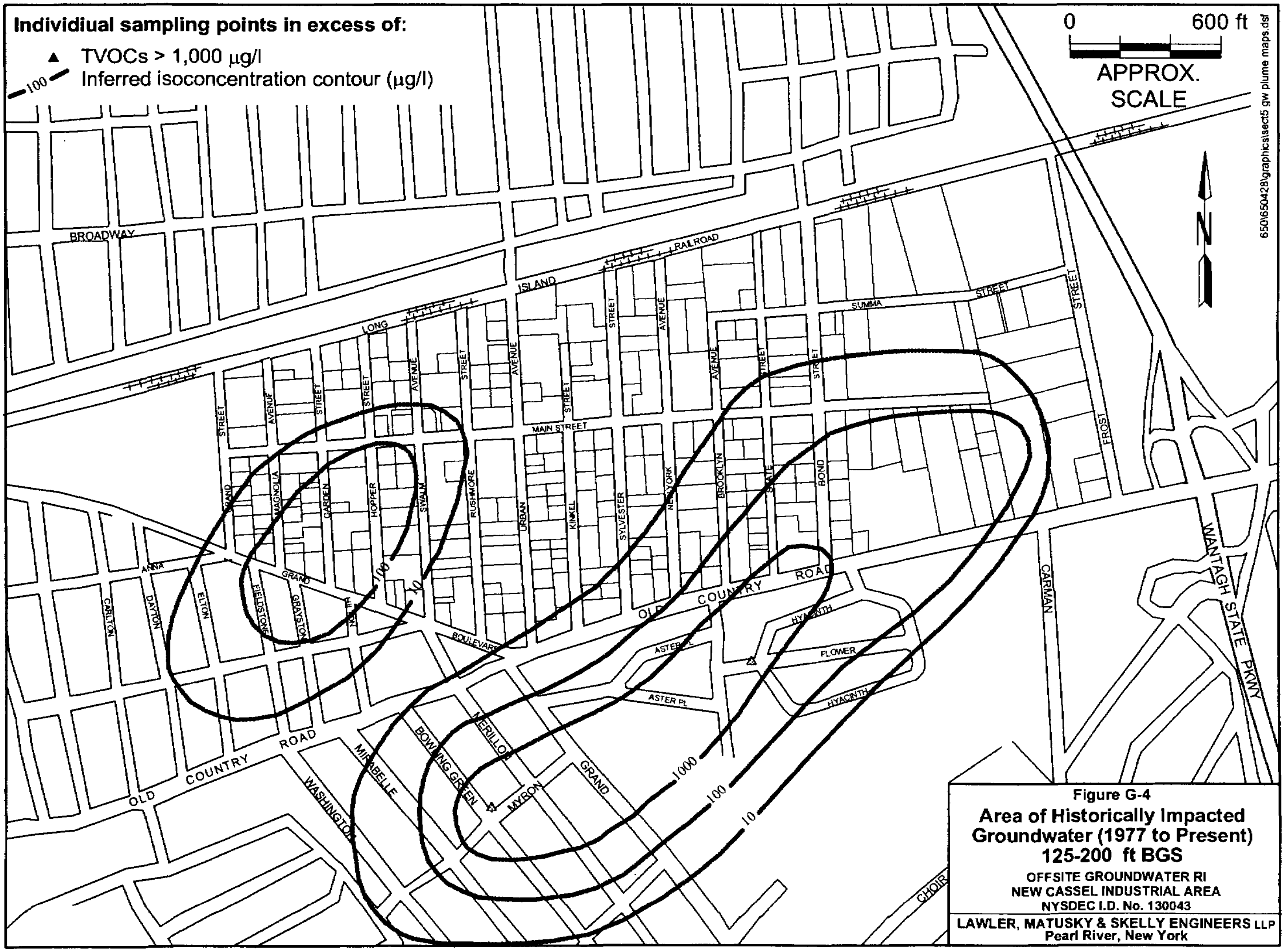


Figure G-4
Area of Historically Impacted Groundwater (1977 to Present) 125-200 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

R2-0001128

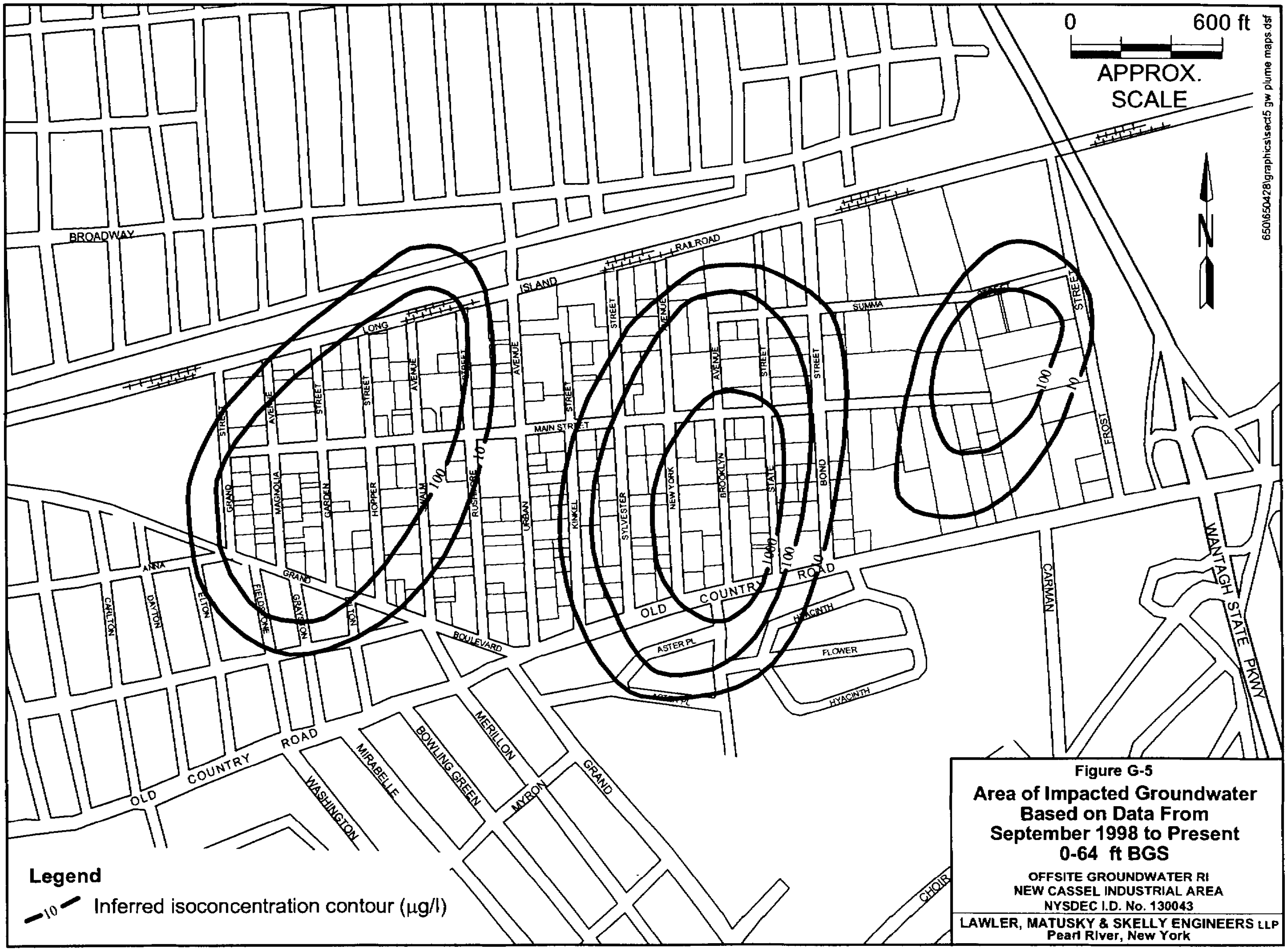


Figure G-5

Area of Impacted Groundwater Based on Data From September 1998 to Present 0-64 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

R2-0001129

Figure G-6

Area of Impacted Groundwater Based on Data From September 1998 to Present 65-99 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

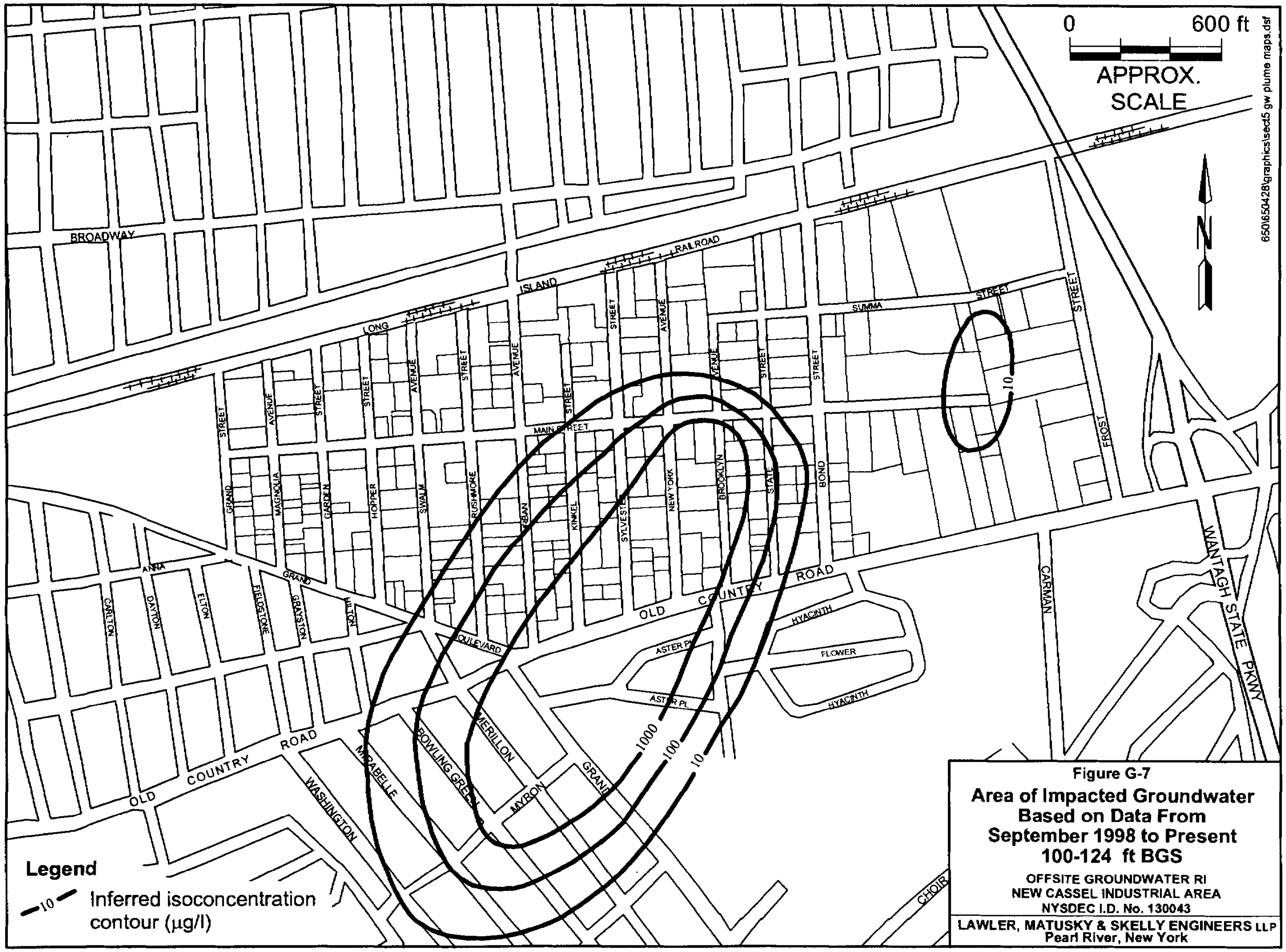


Figure G-7

Area of Impacted Groundwater Based on Data From September 1998 to Present 100-124 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

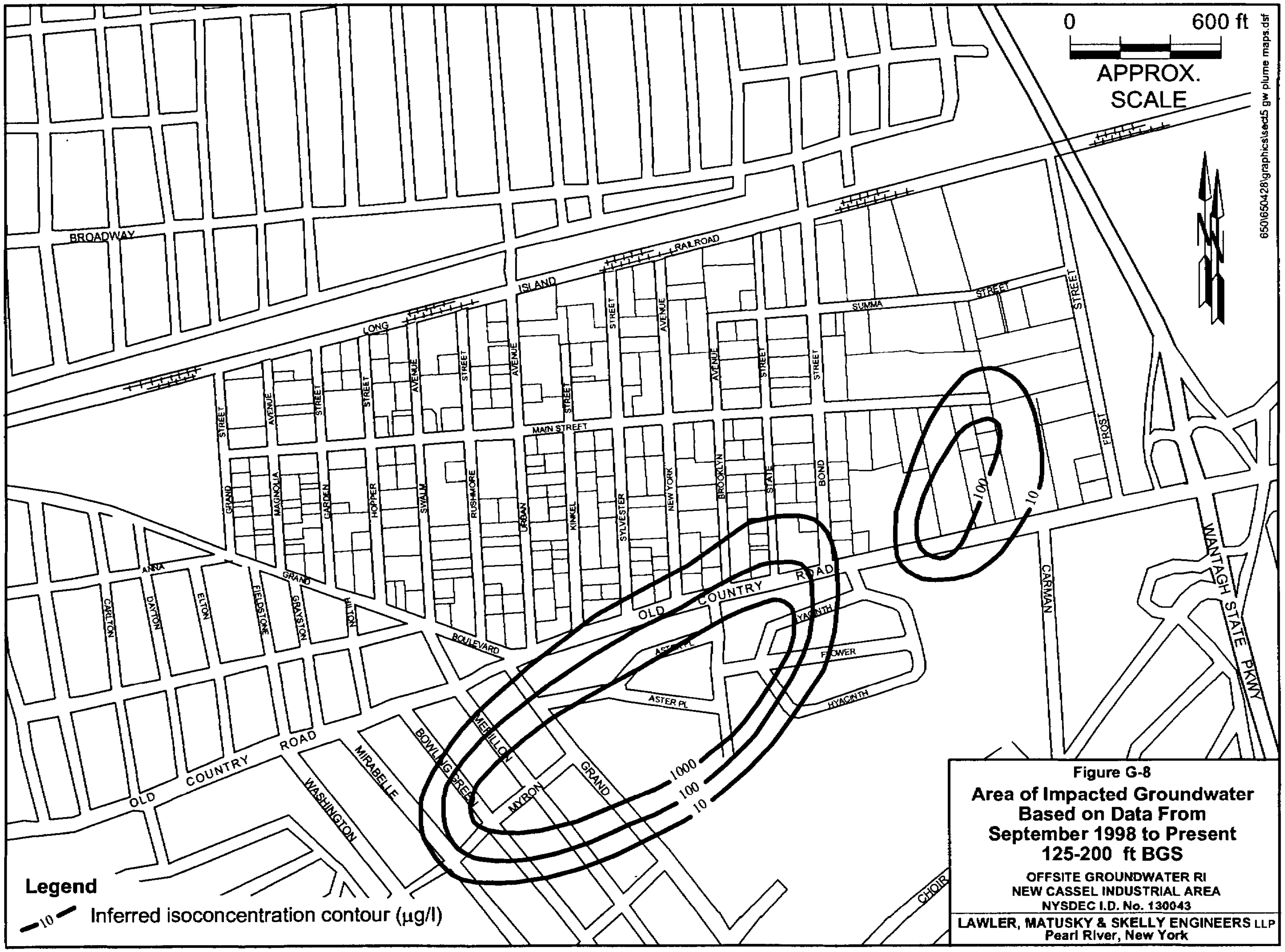


Figure G-8

Area of Impacted Groundwater Based on Data From September 1998 to Present 125-200 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

R2-0001132

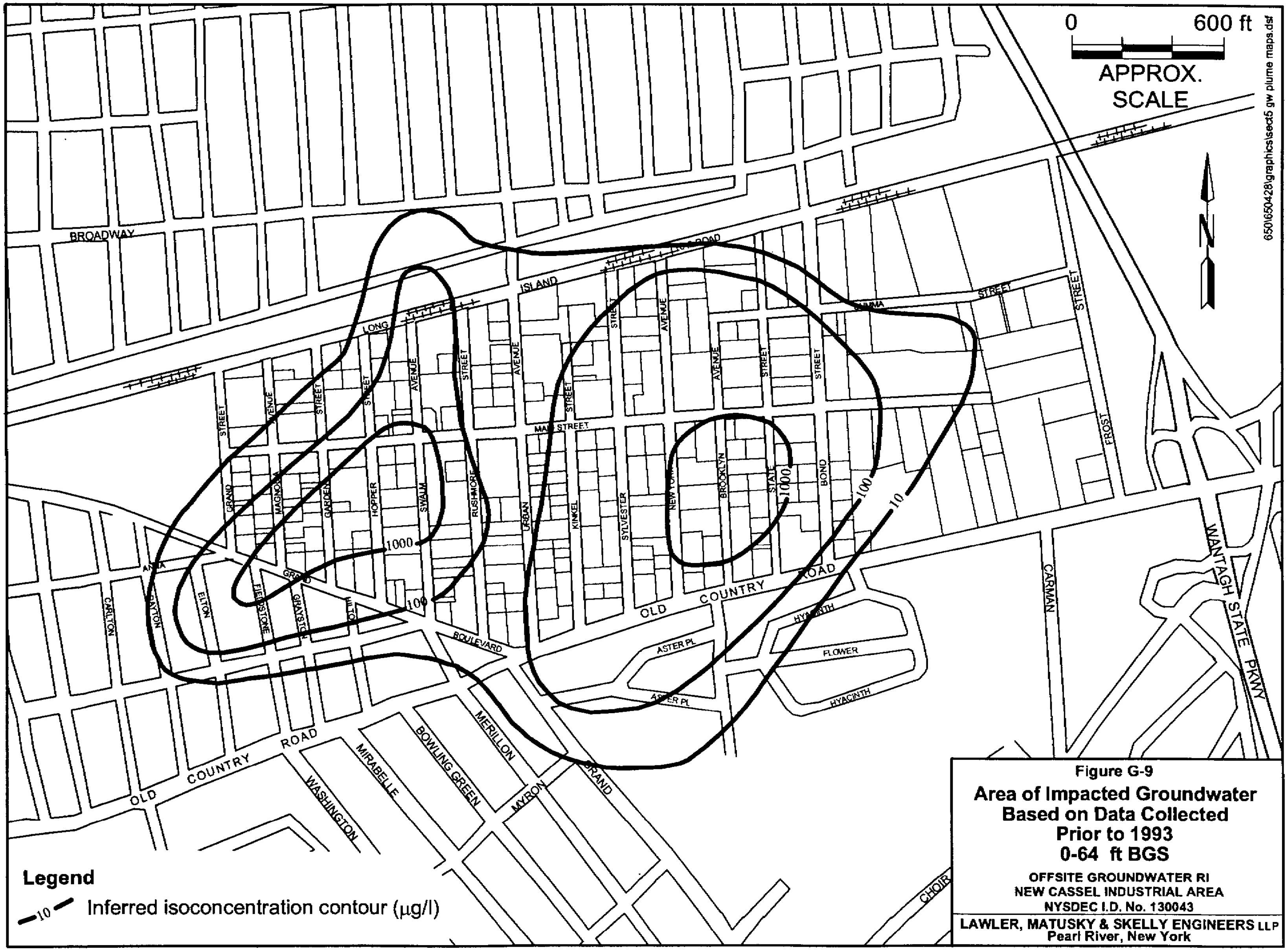


Figure G-9

Area of Impacted Groundwater Based on Data Collected Prior to 1993 0-64 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

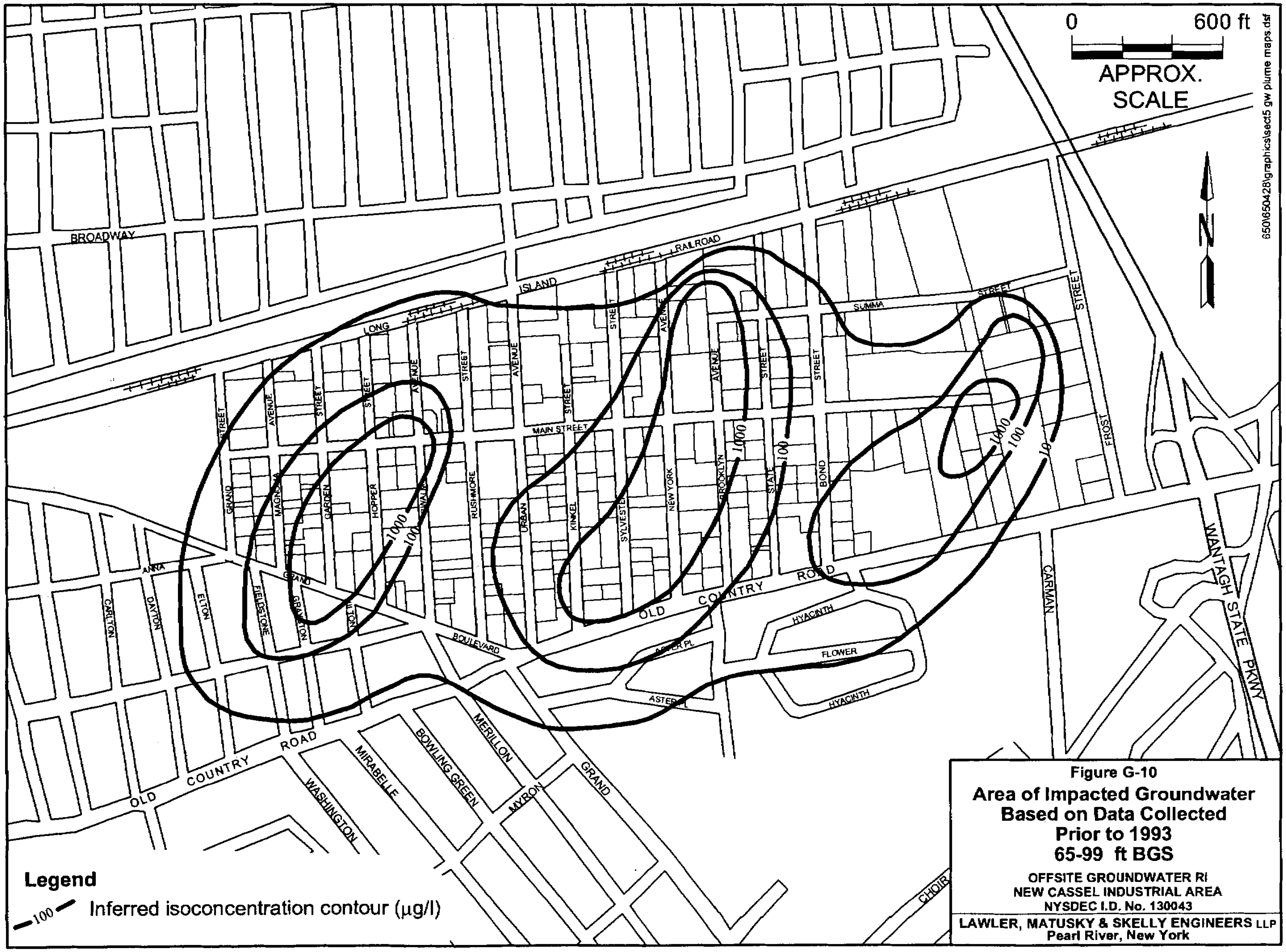


Figure G-10
Area of Impacted Groundwater Based on Data Collected Prior to 1993 65-99 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

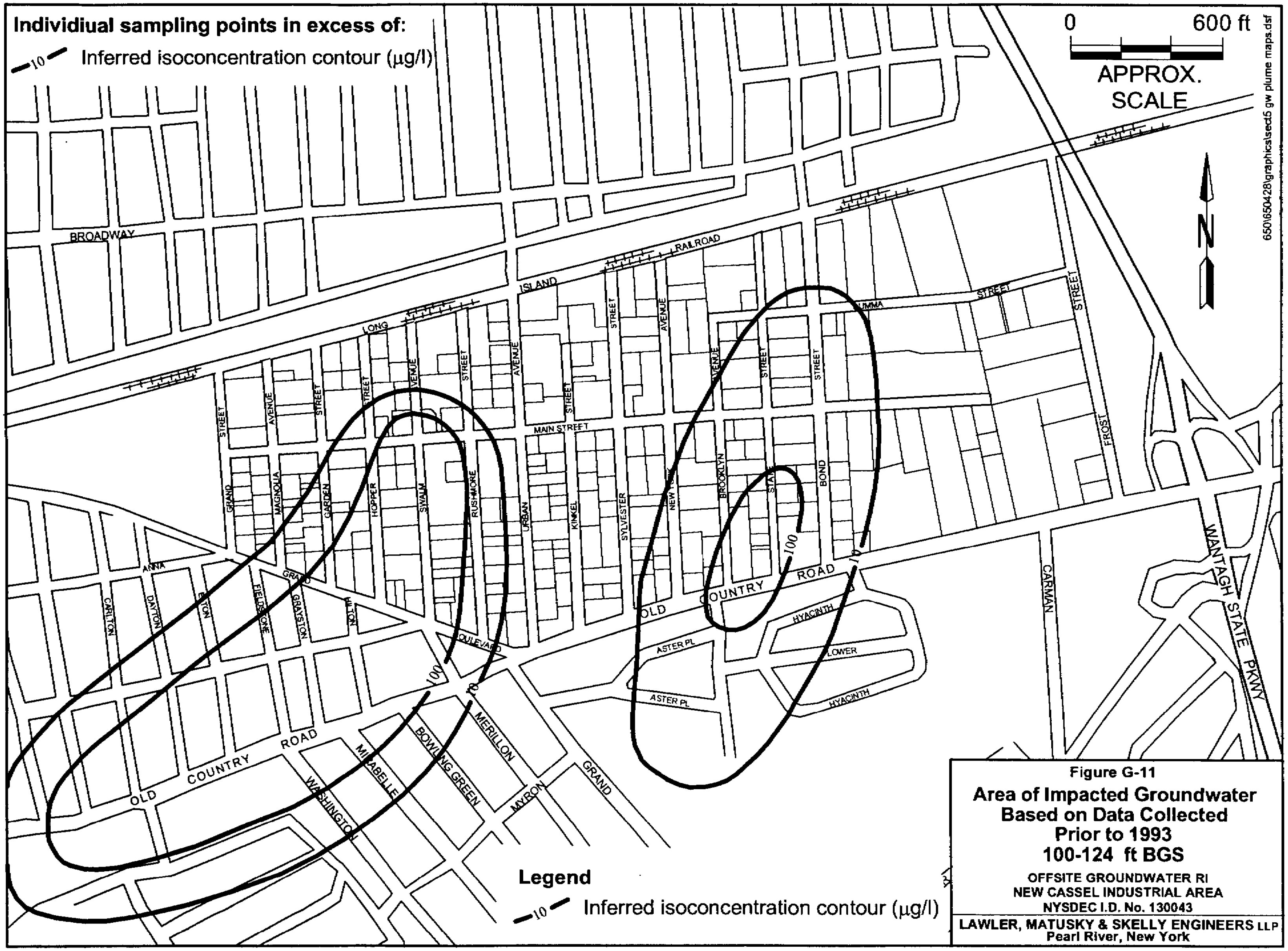


Figure G-11

Area of Impacted Groundwater Based on Data Collected Prior to 1993 100-124 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

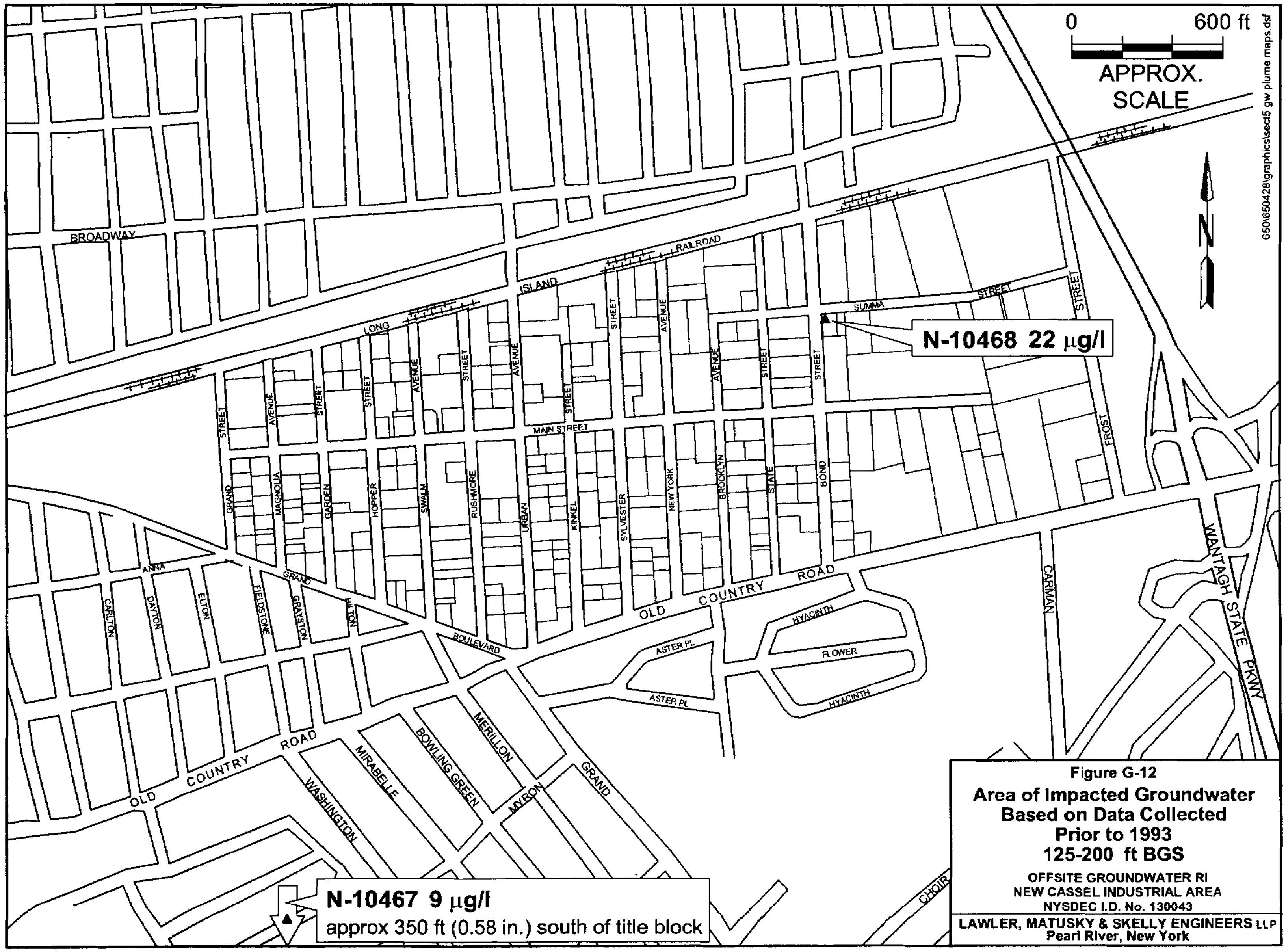


Figure G-12
Area of Impacted Groundwater Based on Data Collected Prior to 1993 125-200 ft BGS
OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043
LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

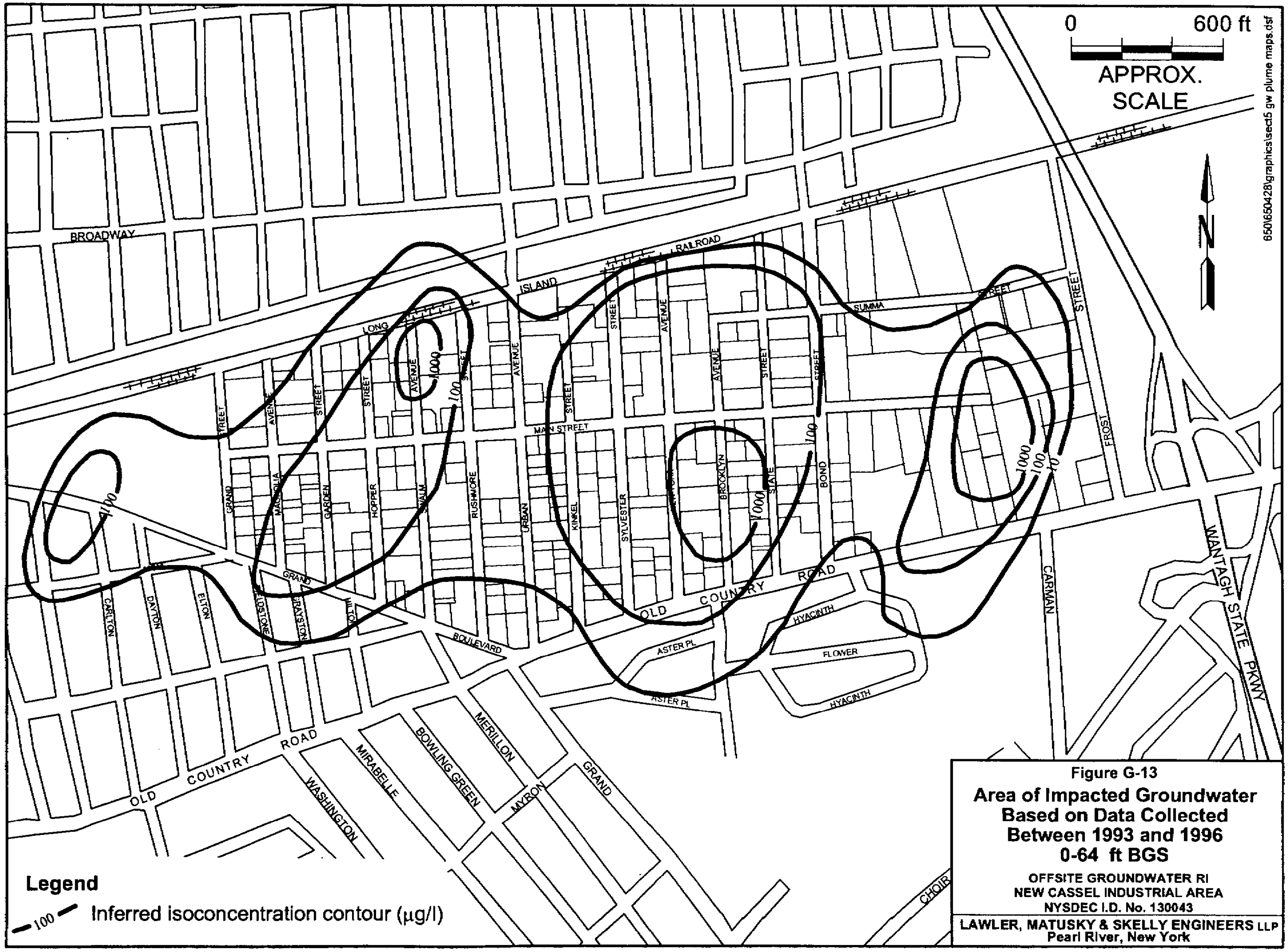


Figure G-13

Area of Impacted Groundwater Based on Data Collected Between 1993 and 1996 0-64 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

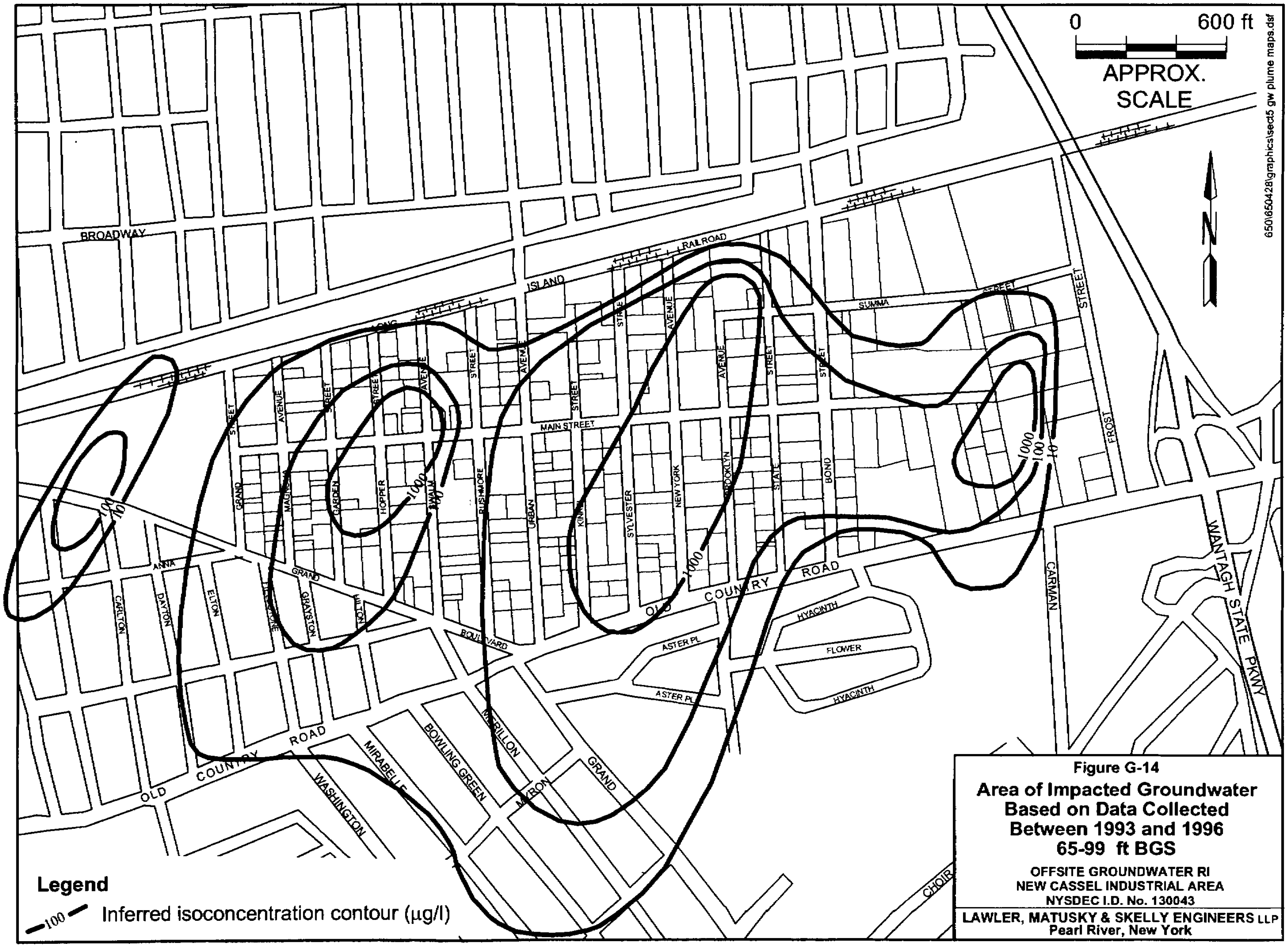


Figure G-14

Area of Impacted Groundwater Based on Data Collected Between 1993 and 1996 65-99 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

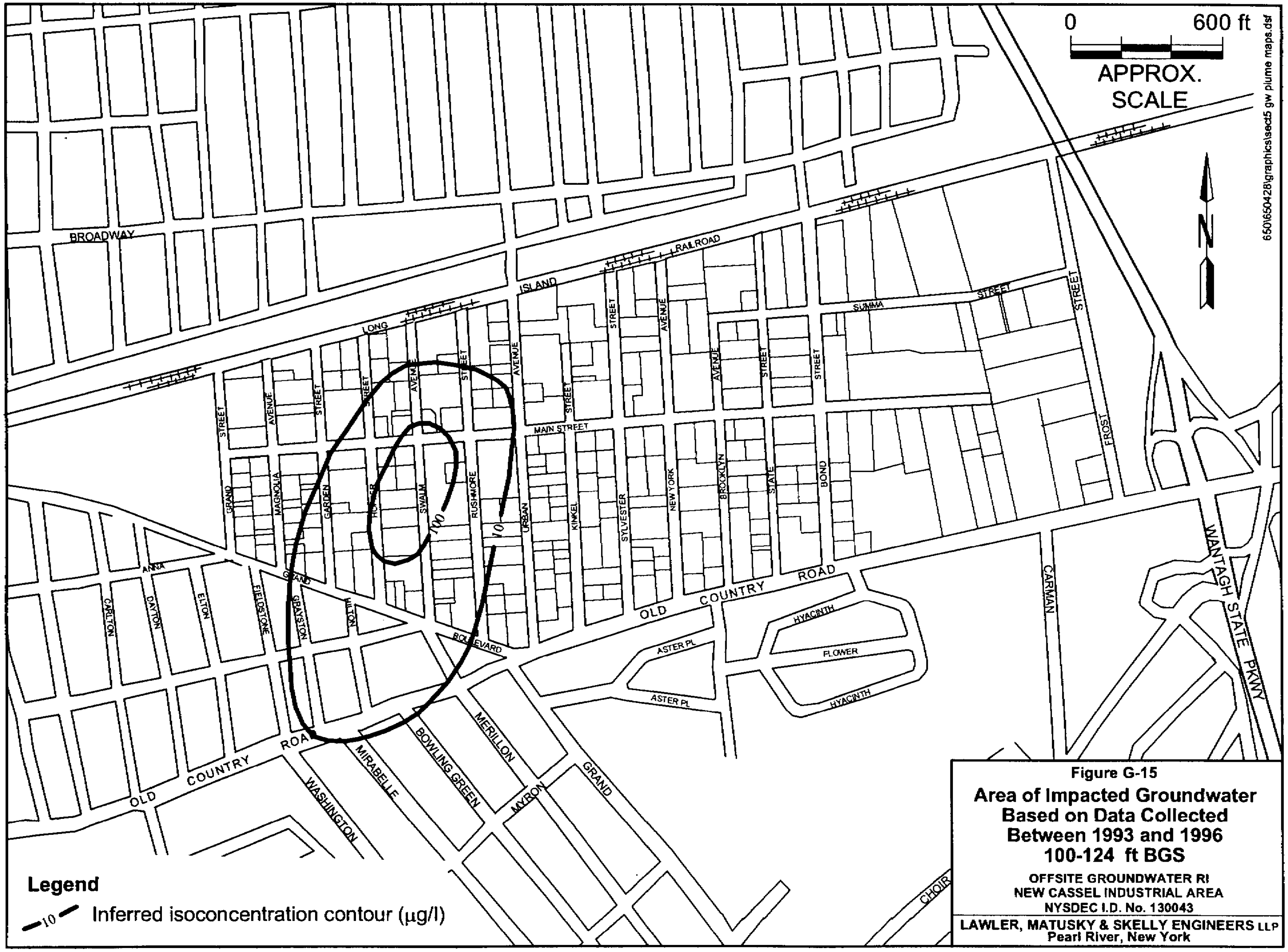


Figure G-15

Area of Impacted Groundwater Based on Data Collected Between 1993 and 1996 100-124 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

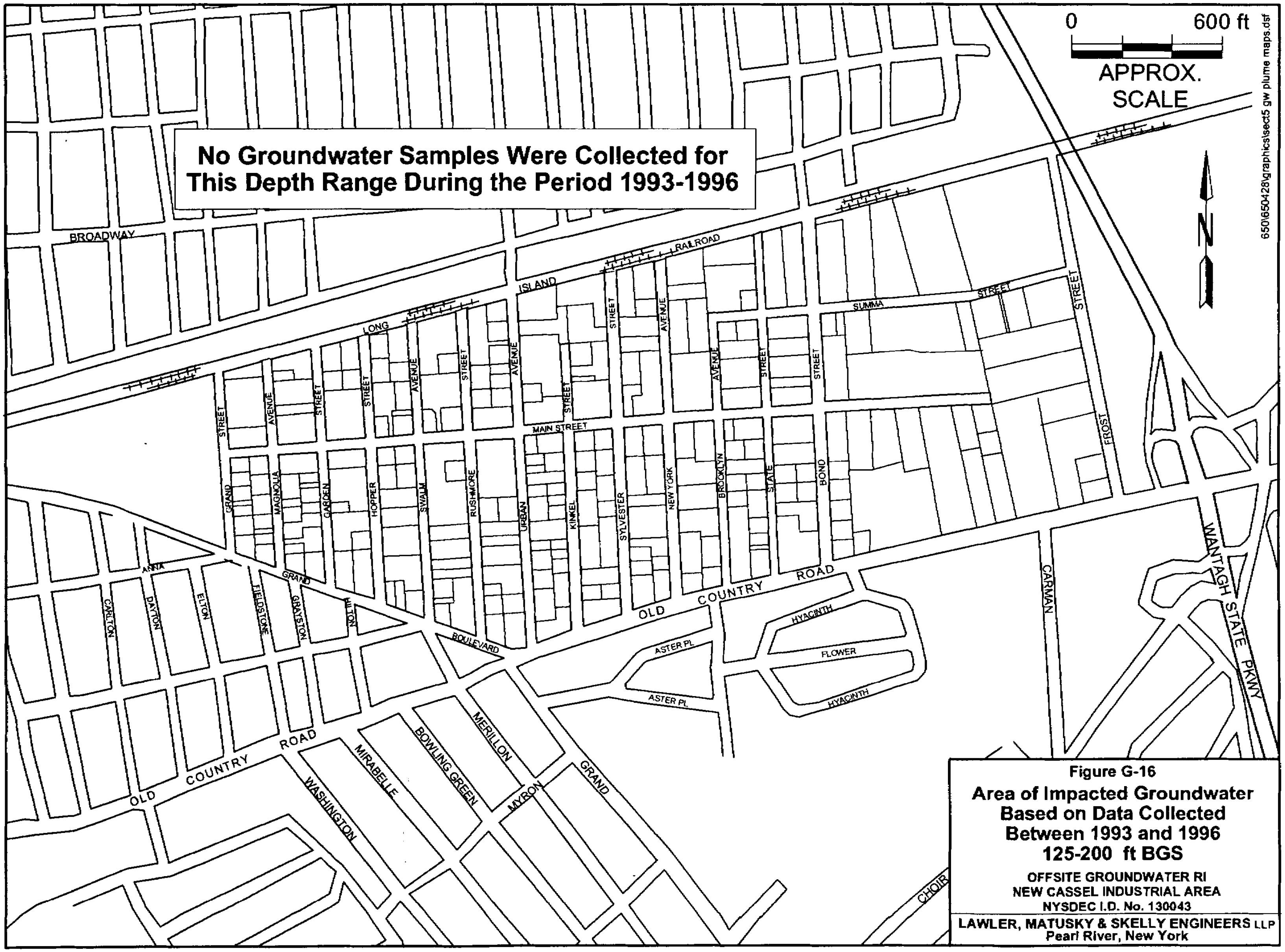


Figure G-16
Area of Impacted Groundwater Based on Data Collected Between 1993 and 1996 125-200 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

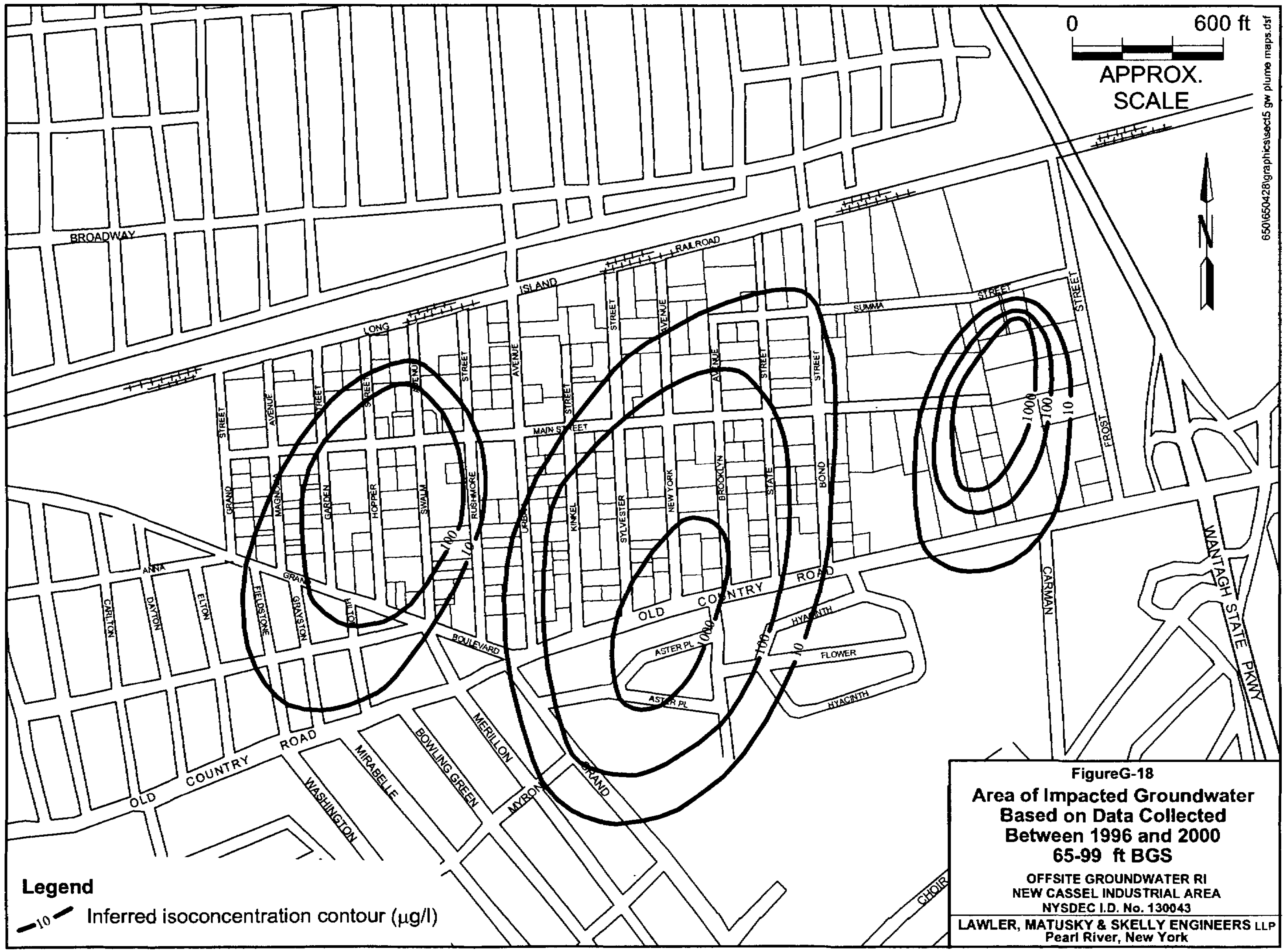
R2-0001140

Figure G-17

Area of Impacted Groundwater Based on Data Collected Between 1996 and 2000 0-64 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York



FigureG-18
Area of Impacted Groundwater Based on Data Collected Between 1996 and 2000 65-99 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

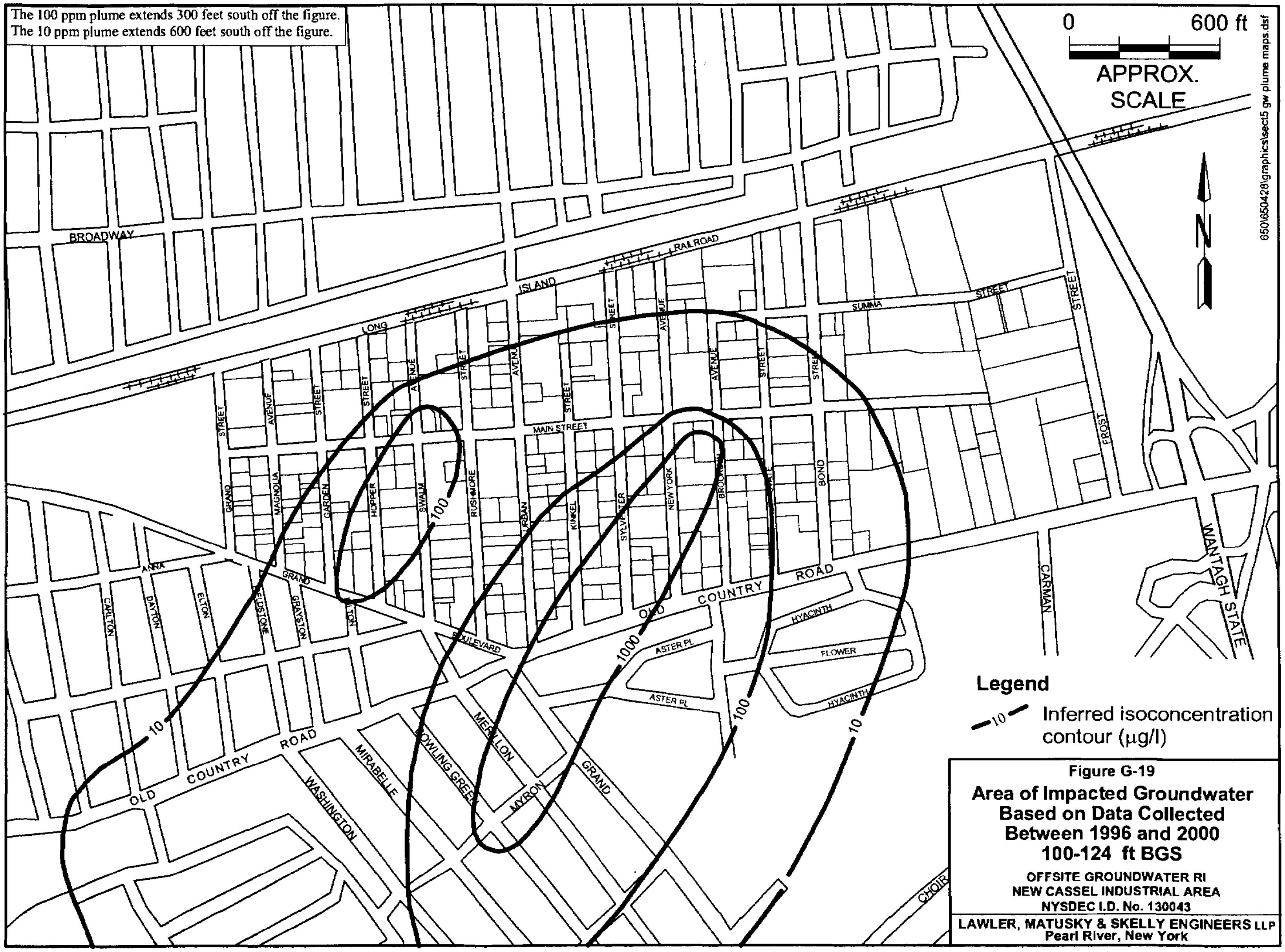


Figure G-19

Area of Impacted Groundwater Based on Data Collected Between 1996 and 2000 100-124 ft BGS

OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

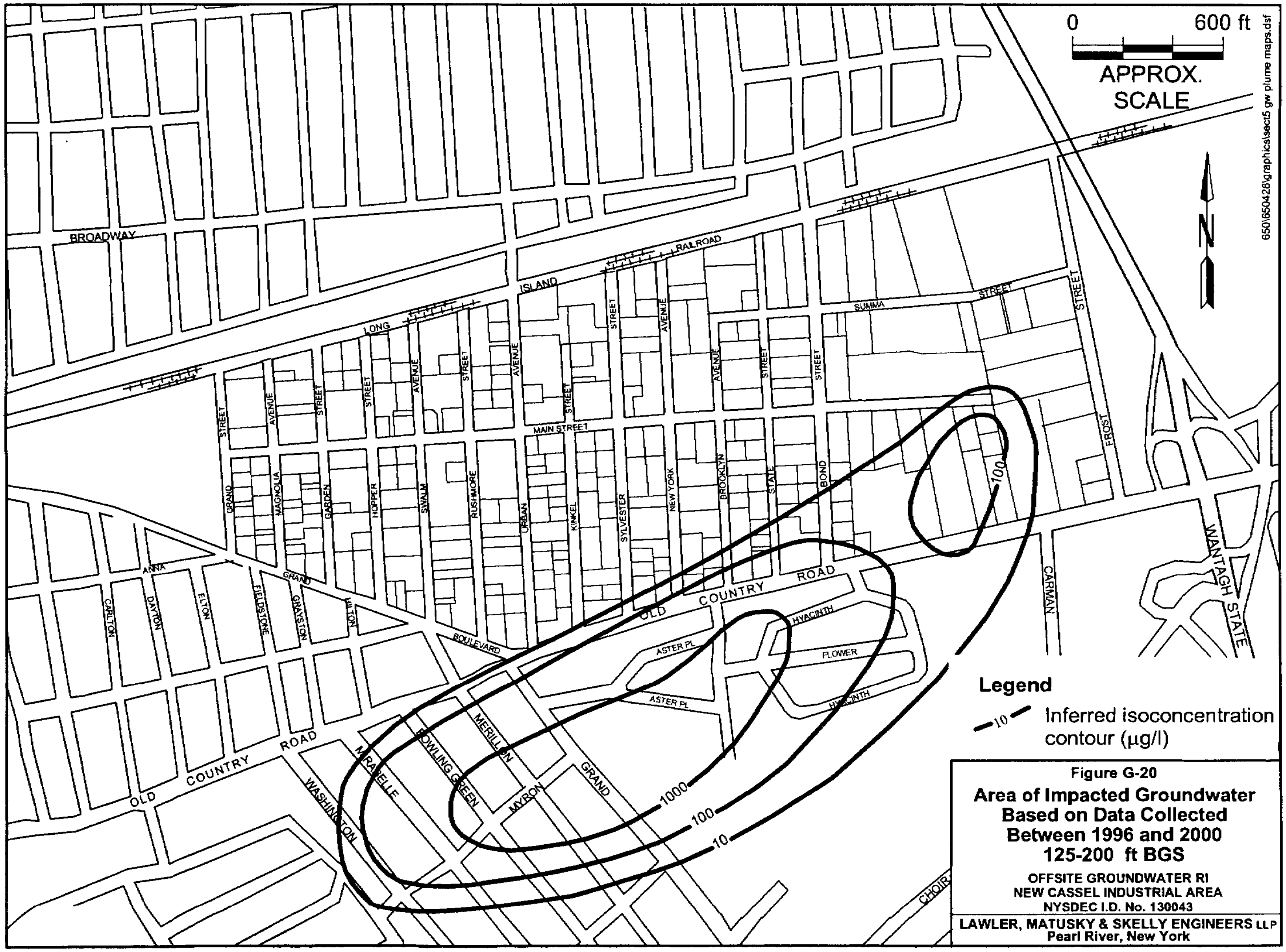


Figure G-20

Area of Impacted Groundwater Based on Data Collected Between 1996 and 2000 125-200 ft BGS

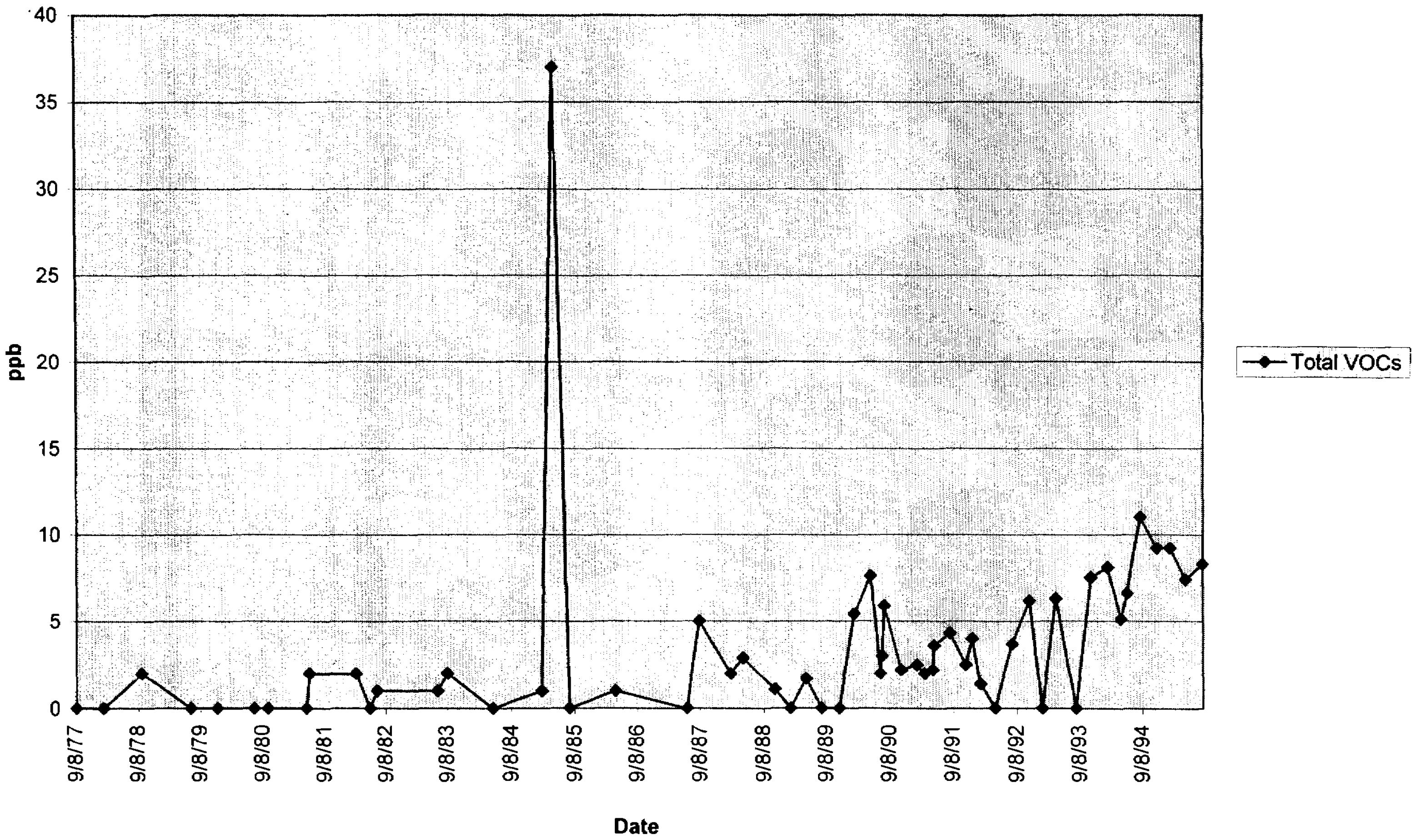
OFFSITE GROUNDWATER RI
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

APPENDIX H

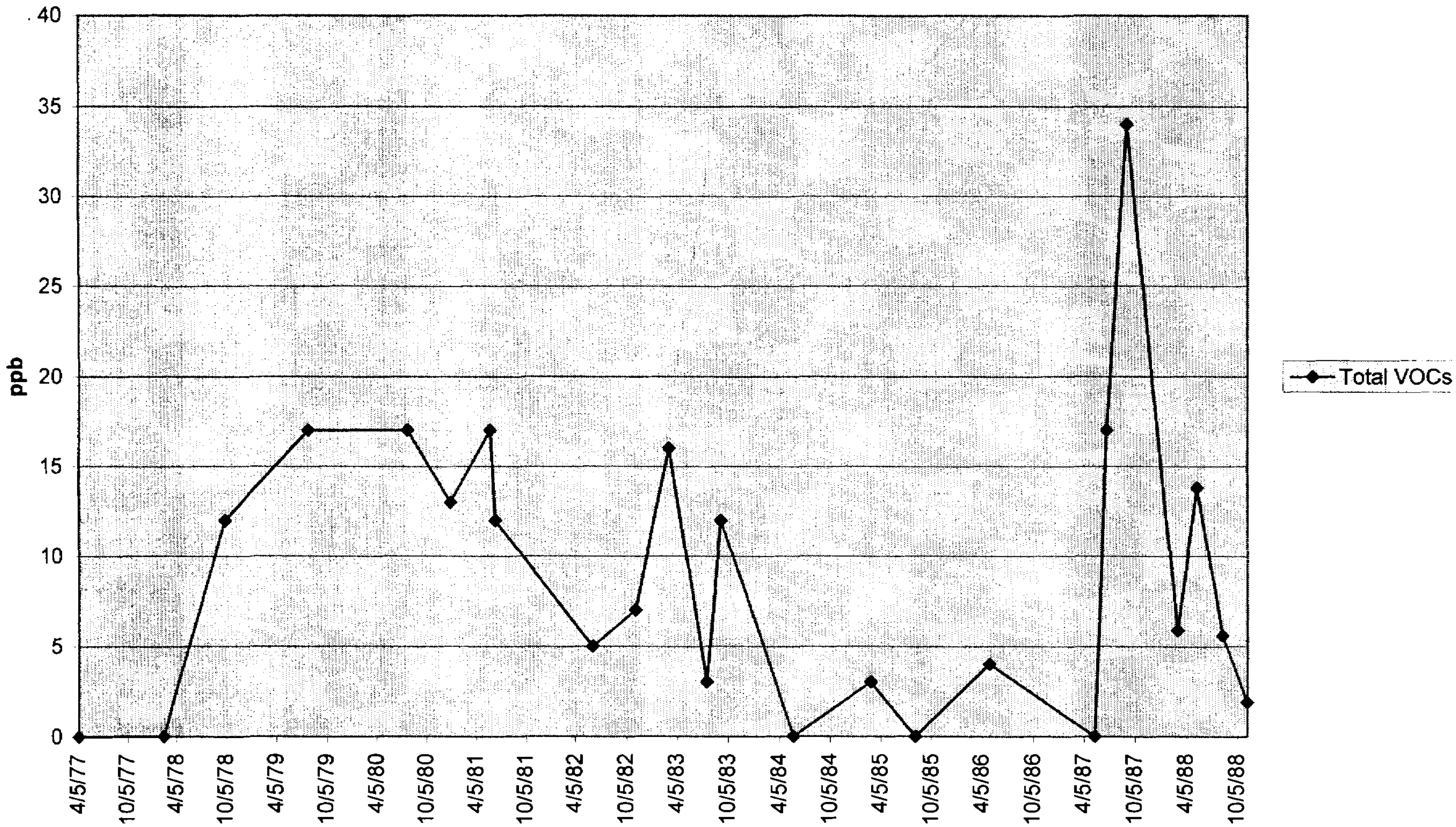
CONCENTRATION vs. TIME PLOTS

N-5655 Total VOCs

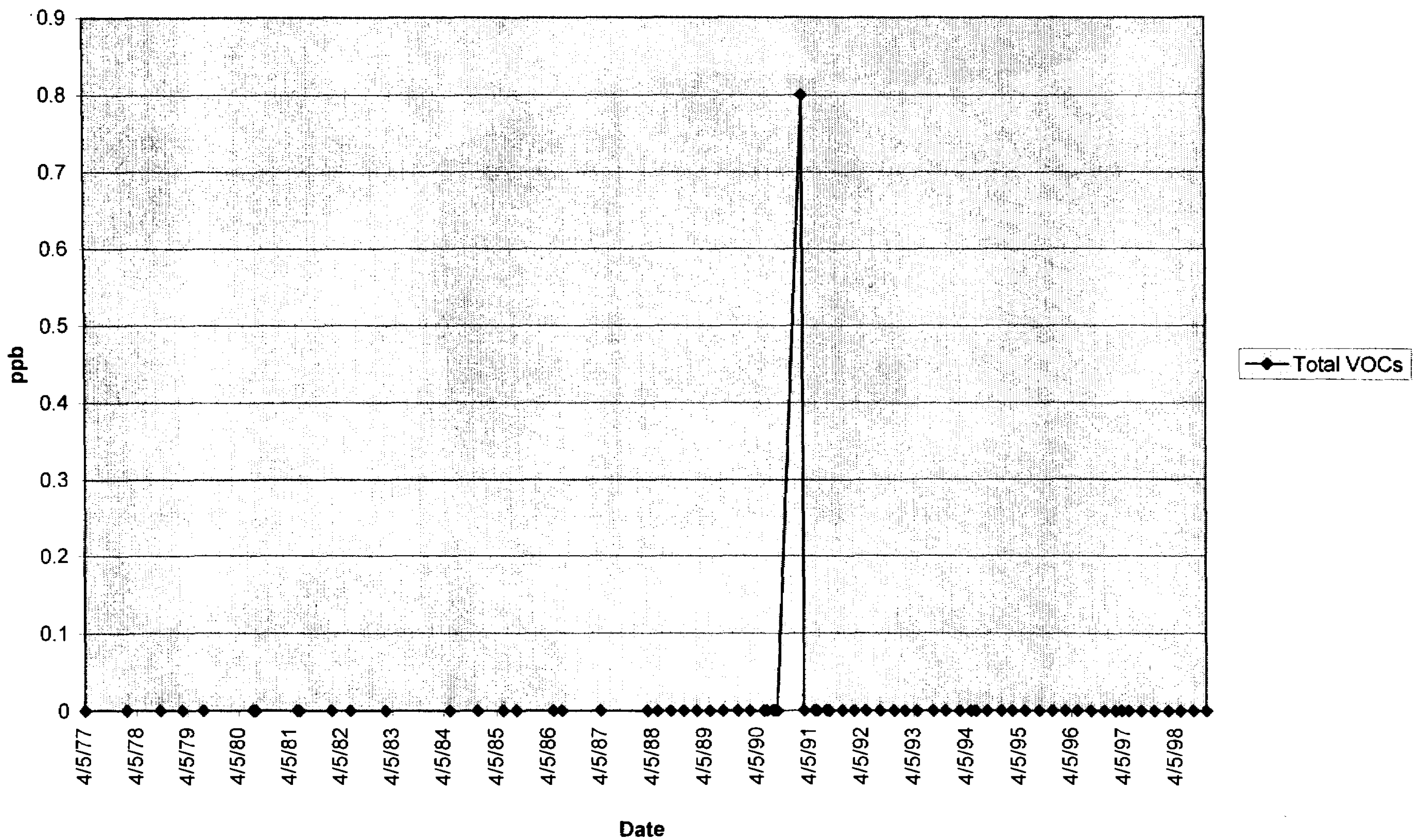


R2-0001146

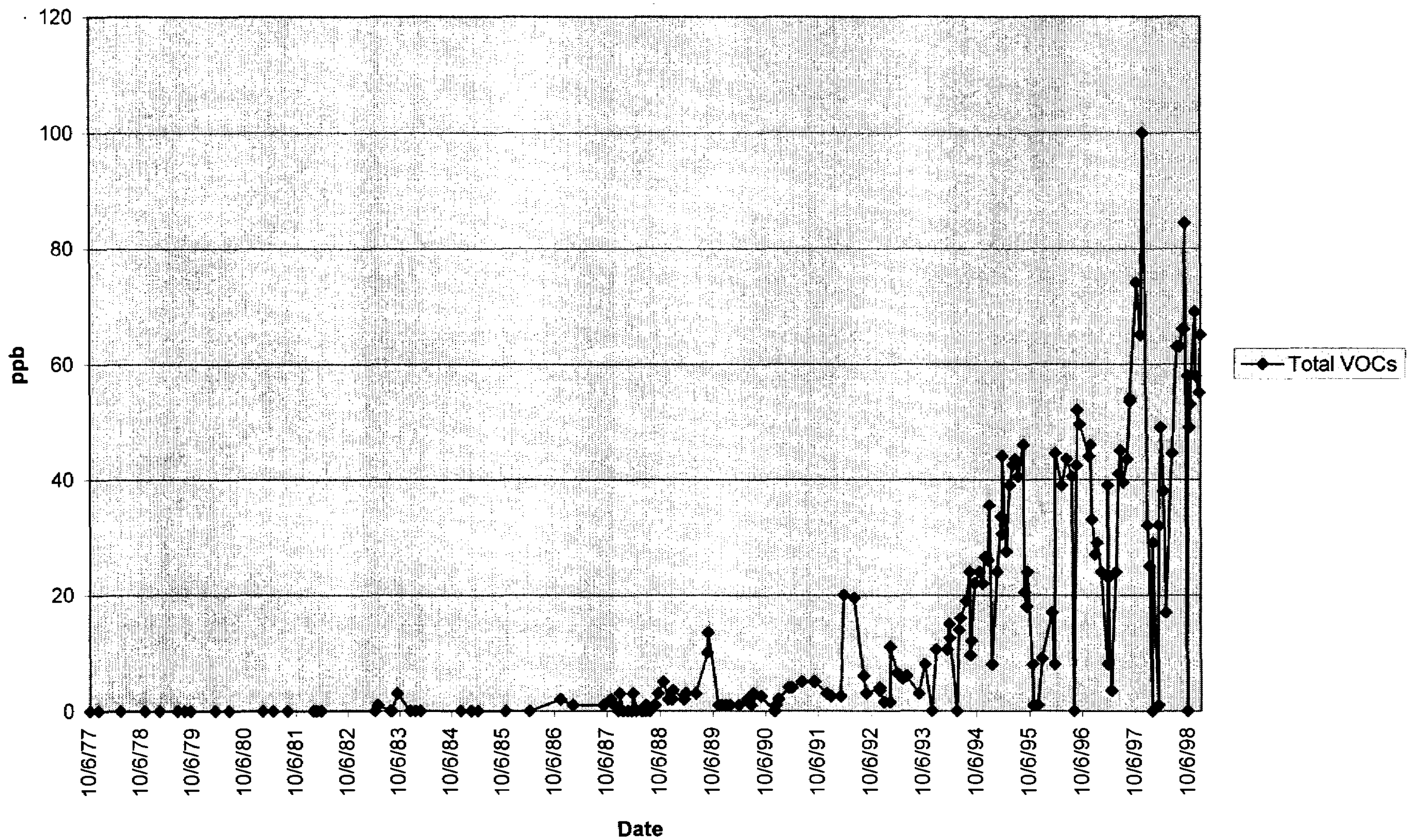
N-6819 Total VOCs



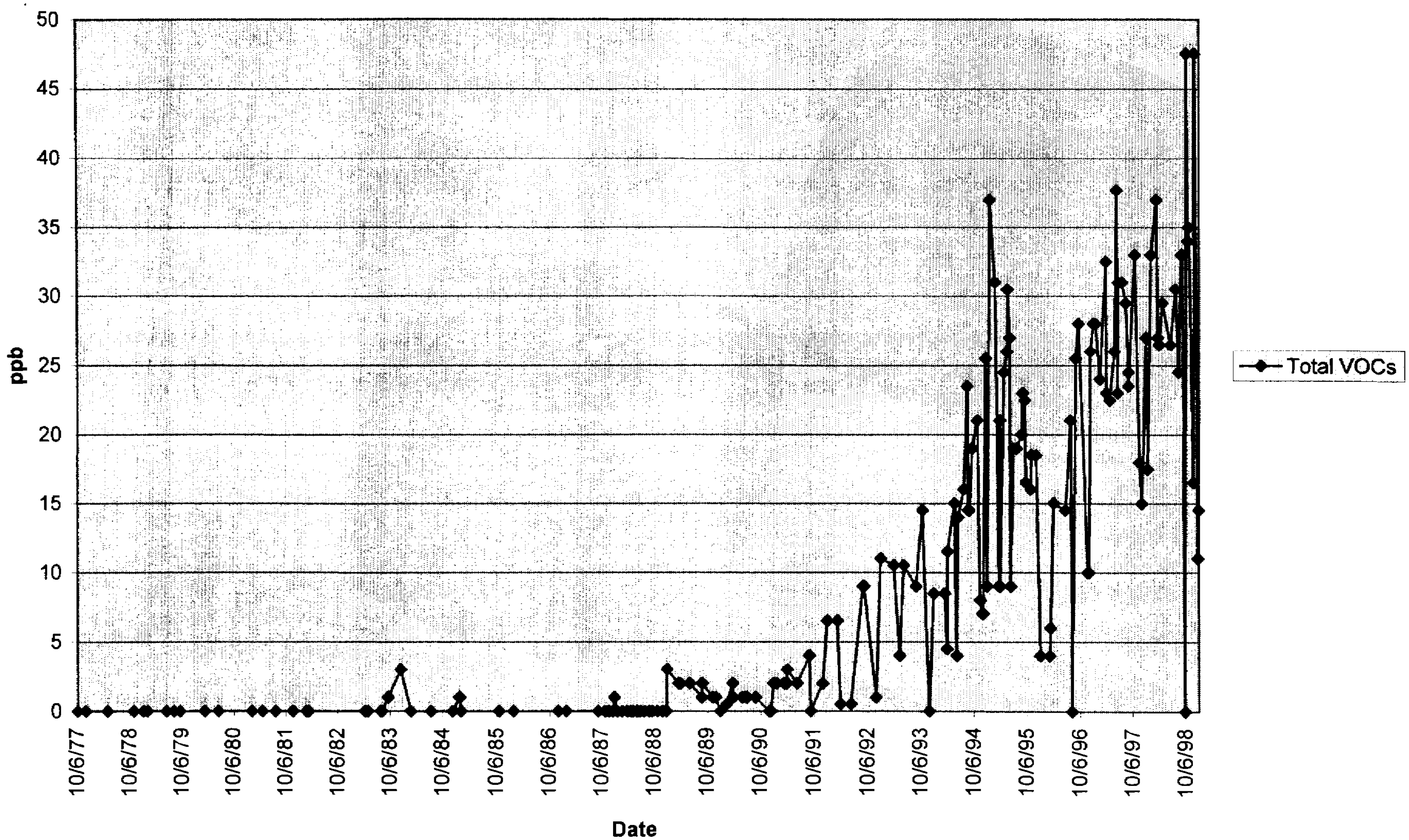
N-8497 Total VOCs

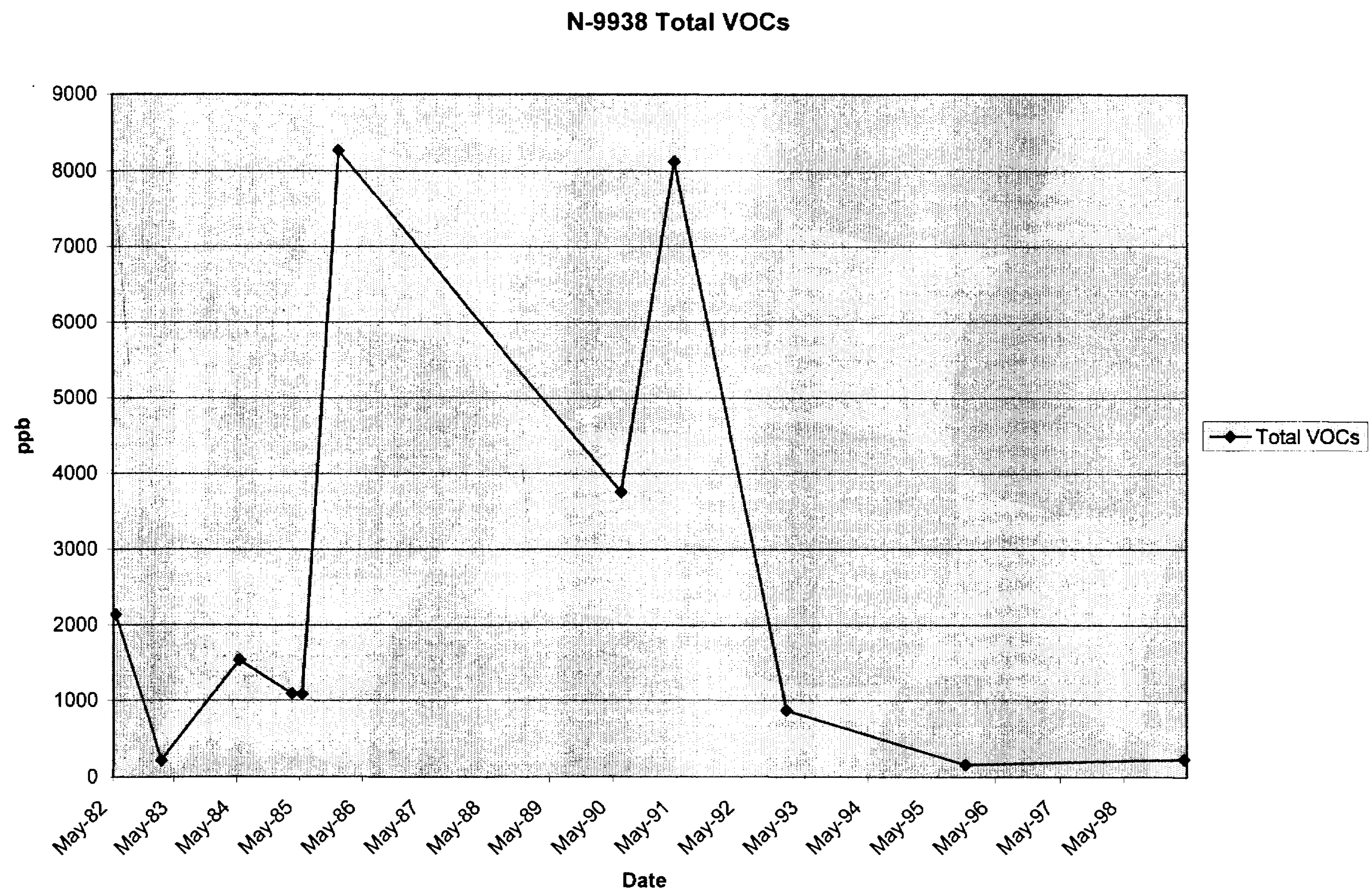


N-8956 Total VOCs

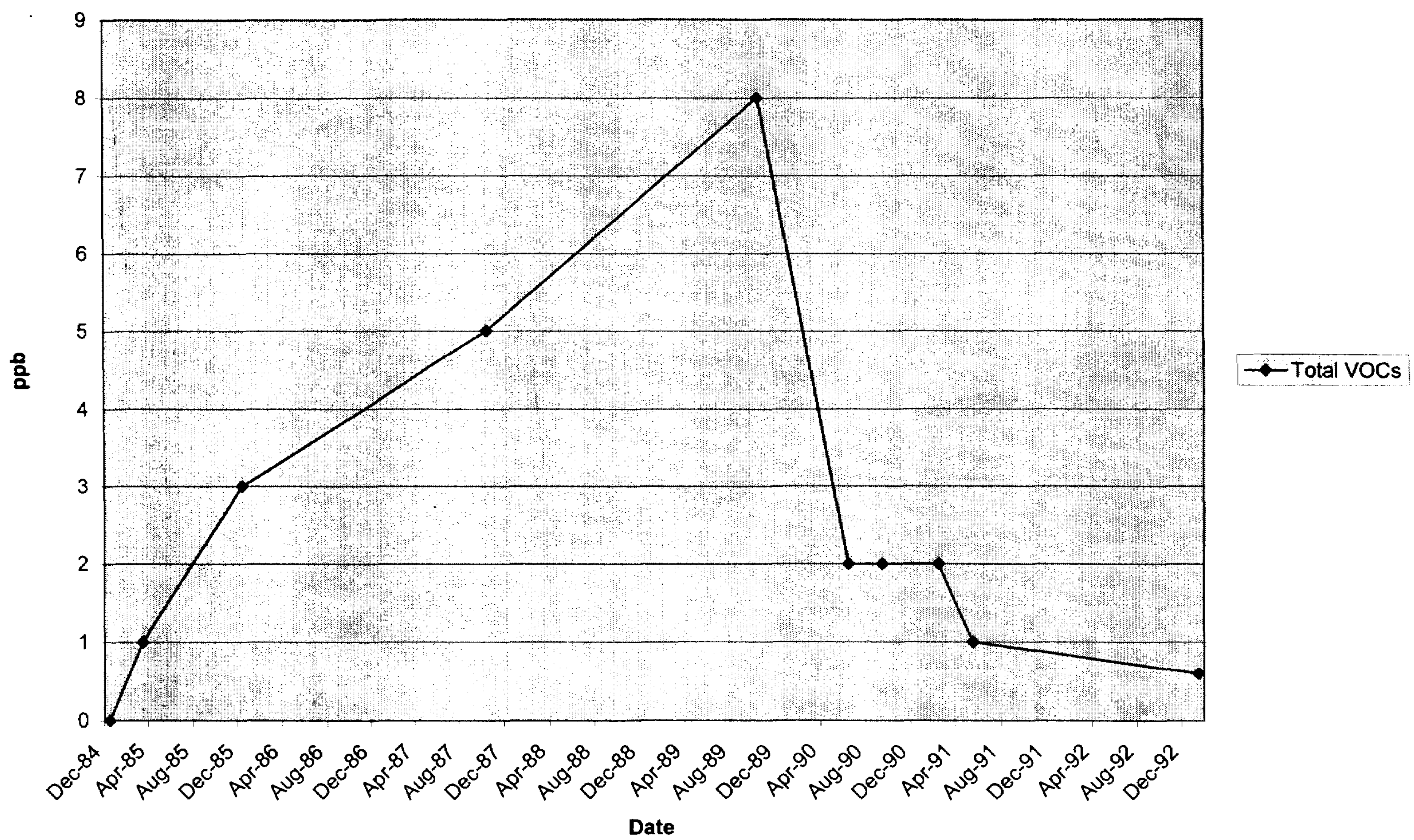


N-8957 Total VOCs



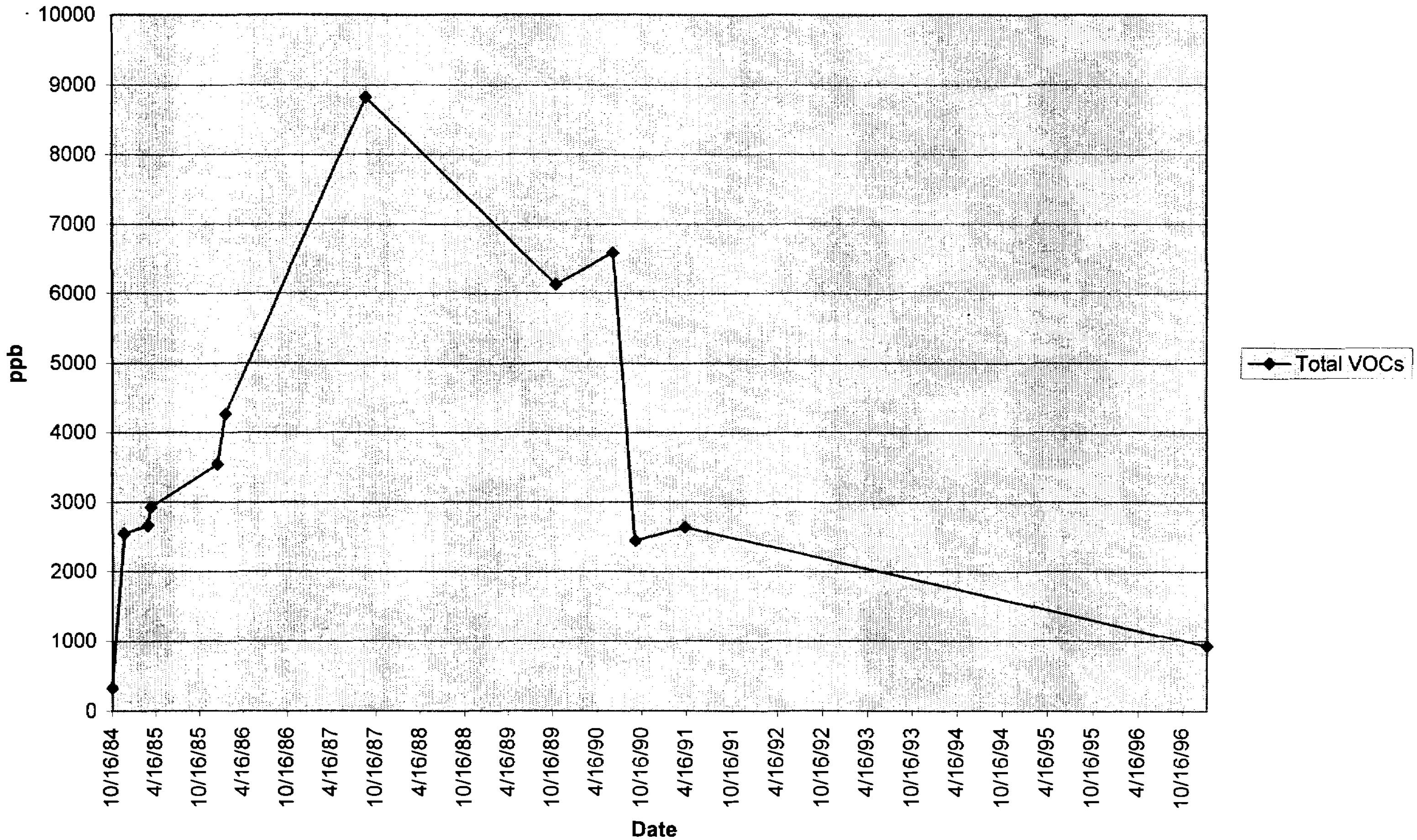

N-9938 Total VOCs
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
ppb
May-82
May-83
May-84
May-85
May-86
May-87
May-88
May-89
May-90
May-91
May-92
May-93
May-94
May-95
May-96
May-97
May-98
Date
Total VOCs

N-10318 Total VOCs

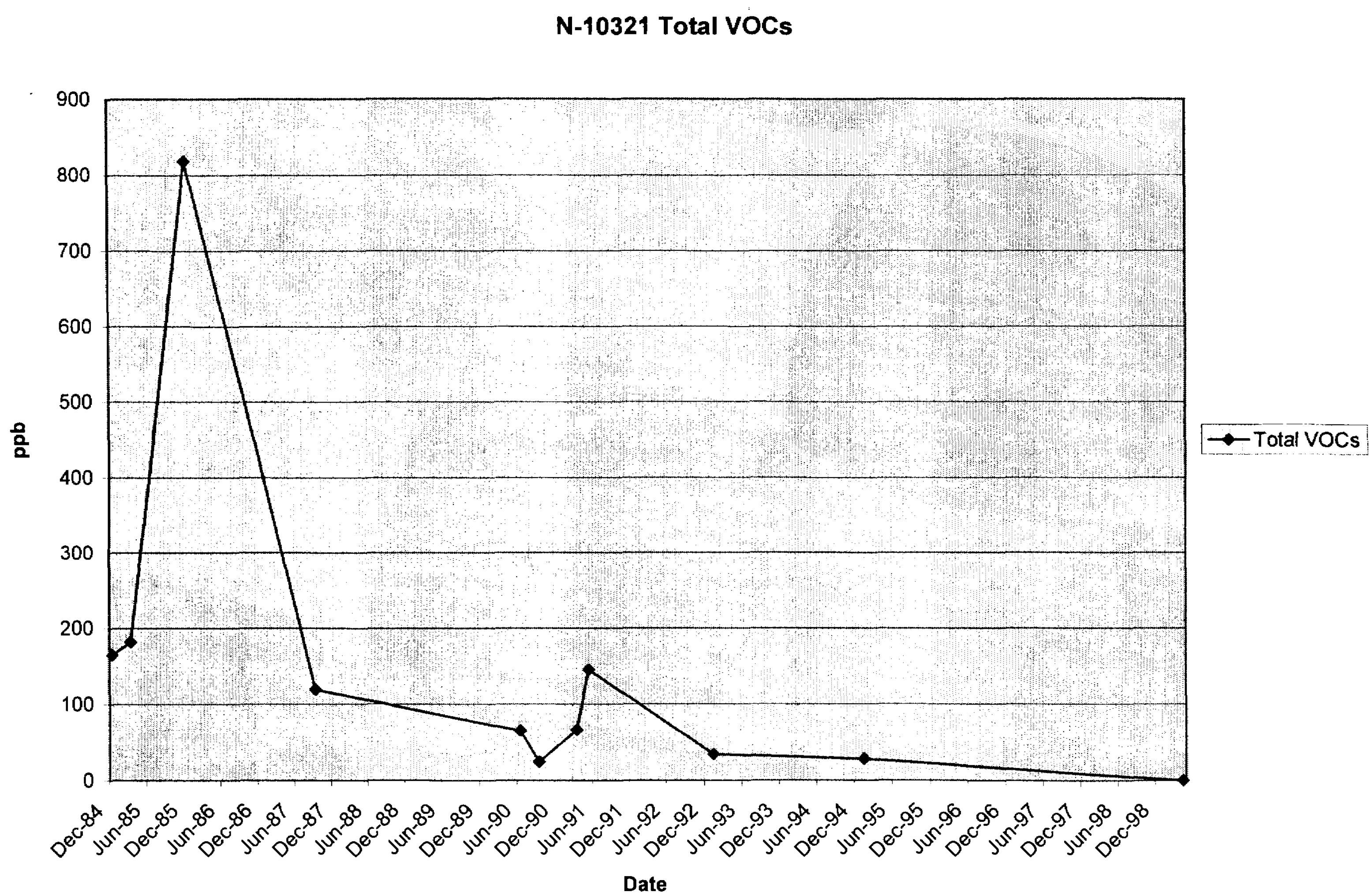


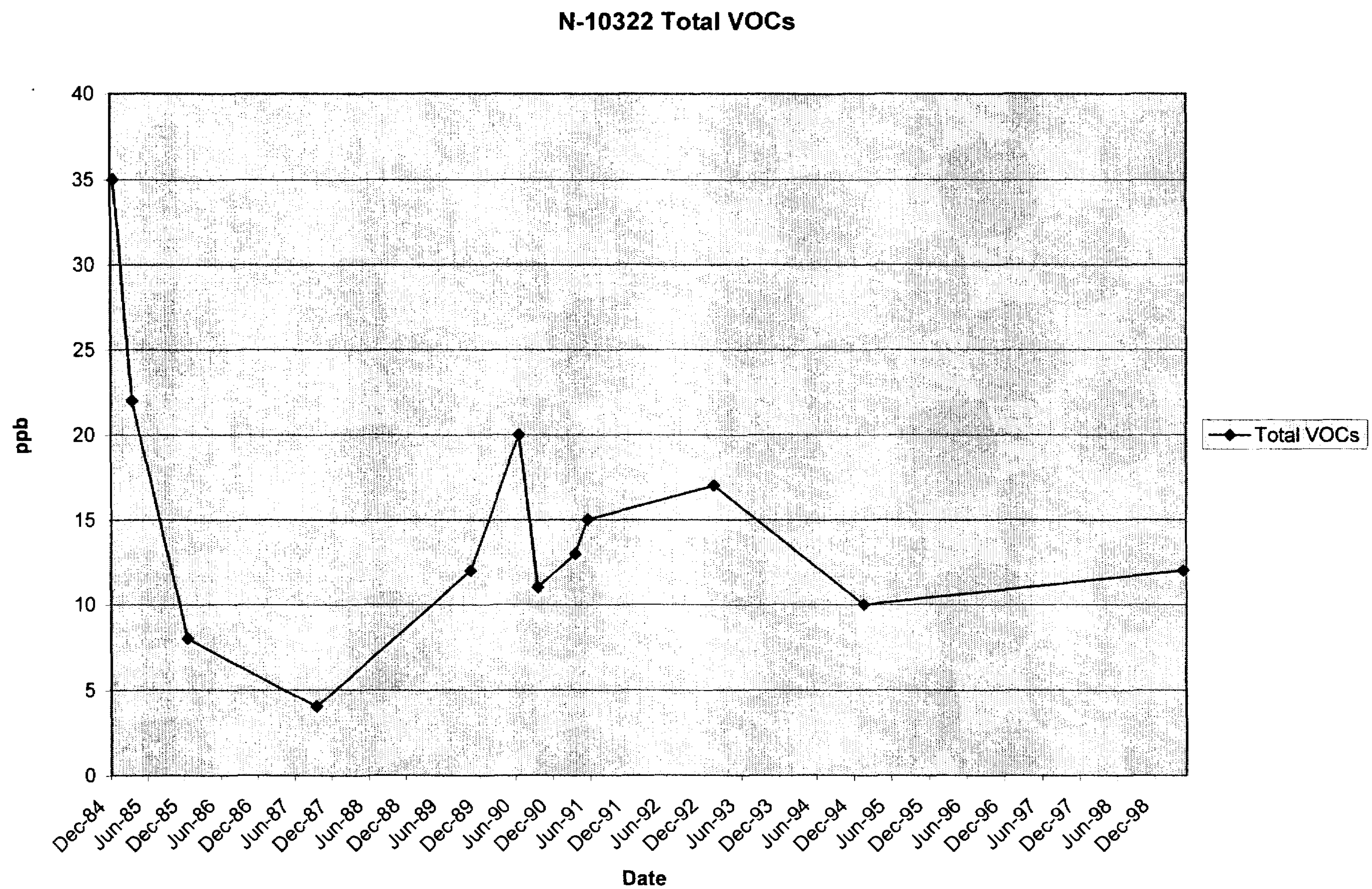
R2-0001152

N-10319 Total VOCs

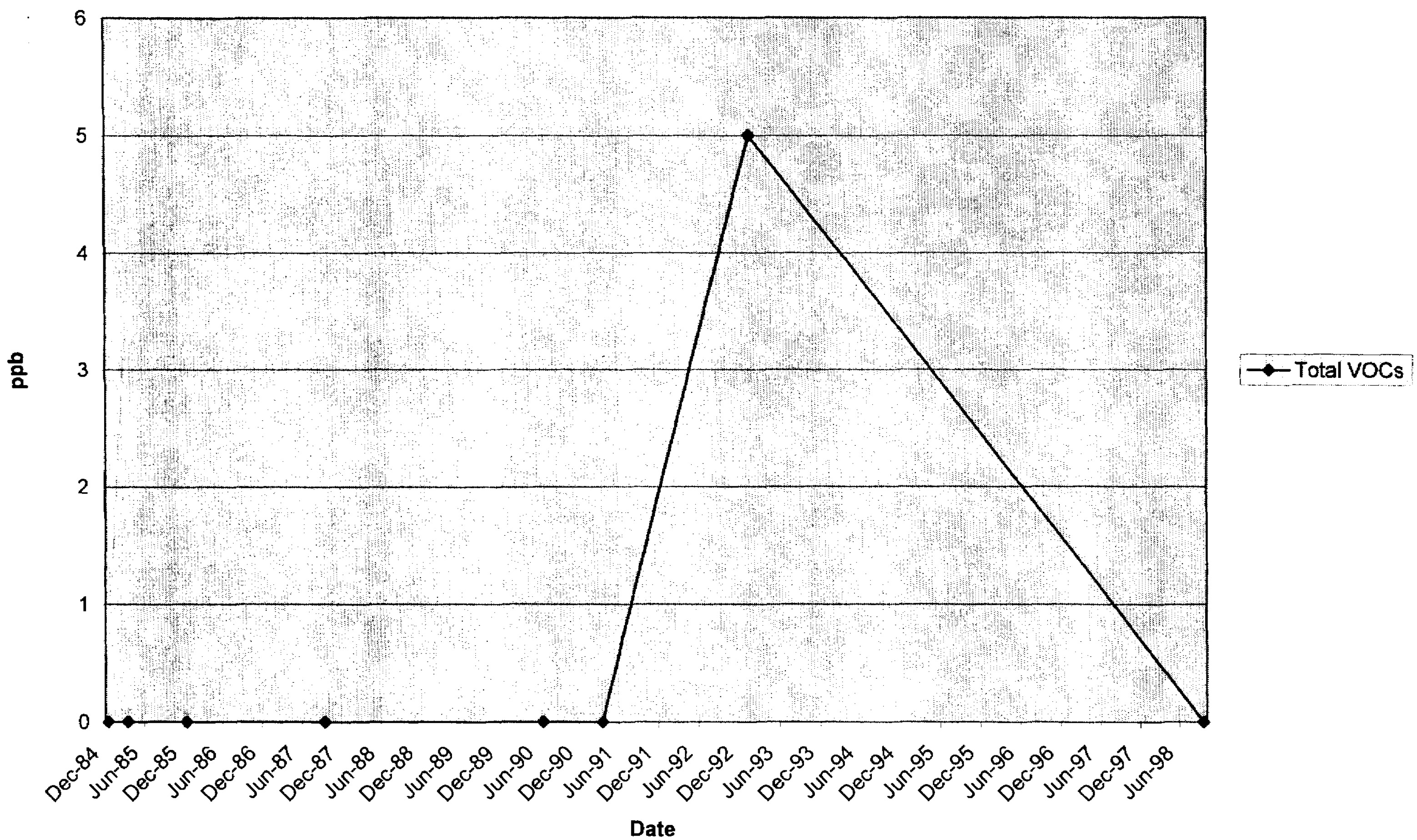


R2-0001153


N-10321 Total VOCs
900
800
700
600
500
400
300
200
100
0
ppb
Total VOCs
Dec-84
Jun-85
Dec-85
Jun-86
Dec-86
Jun-87
Dec-87
Jun-88
Dec-88
Jun-89
Dec-89
Jun-90
Dec-90
Jun-91
Dec-91
Jun-92
Dec-92
Jun-93
Dec-93
Jun-94
Dec-94
Jun-95
Dec-95
Jun-96
Dec-96
Jun-97
Dec-97
Jun-98
Dec-98
Date

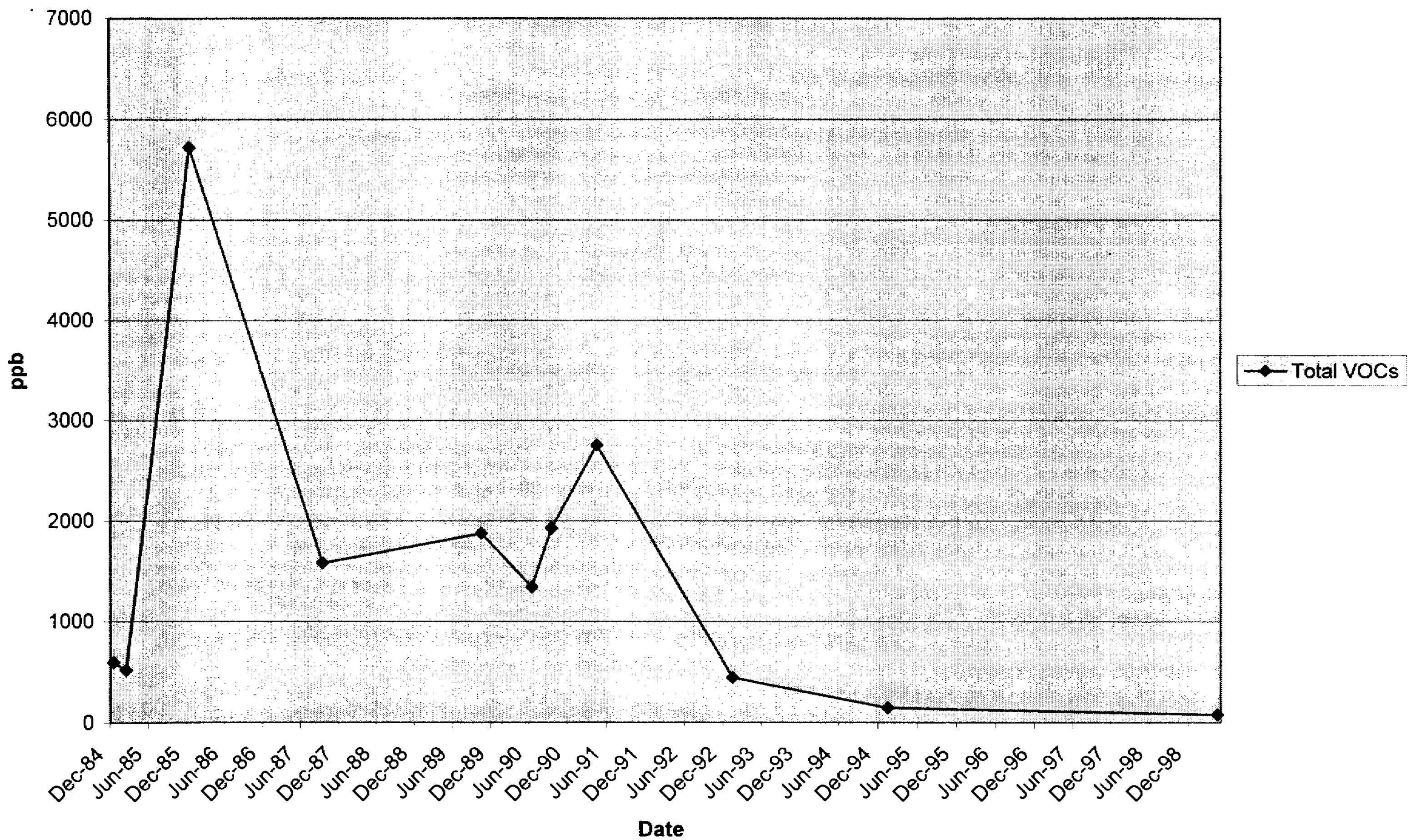

N-10322 Total VOCs
ppb
40
35
30
25
20
15
10
5
0
Dec-84
Jun-85
Dec-85
Jun-86
Dec-86
Jun-87
Dec-87
Jun-88
Dec-88
Jun-89
Dec-89
Jun-90
Dec-90
Jun-91
Dec-91
Jun-92
Dec-92
Jun-93
Dec-93
Jun-94
Dec-94
Jun-95
Dec-95
Jun-96
Dec-96
Jun-97
Dec-97
Jun-98
Dec-98
Date
Total VOCs

N-10323 Total VOCs

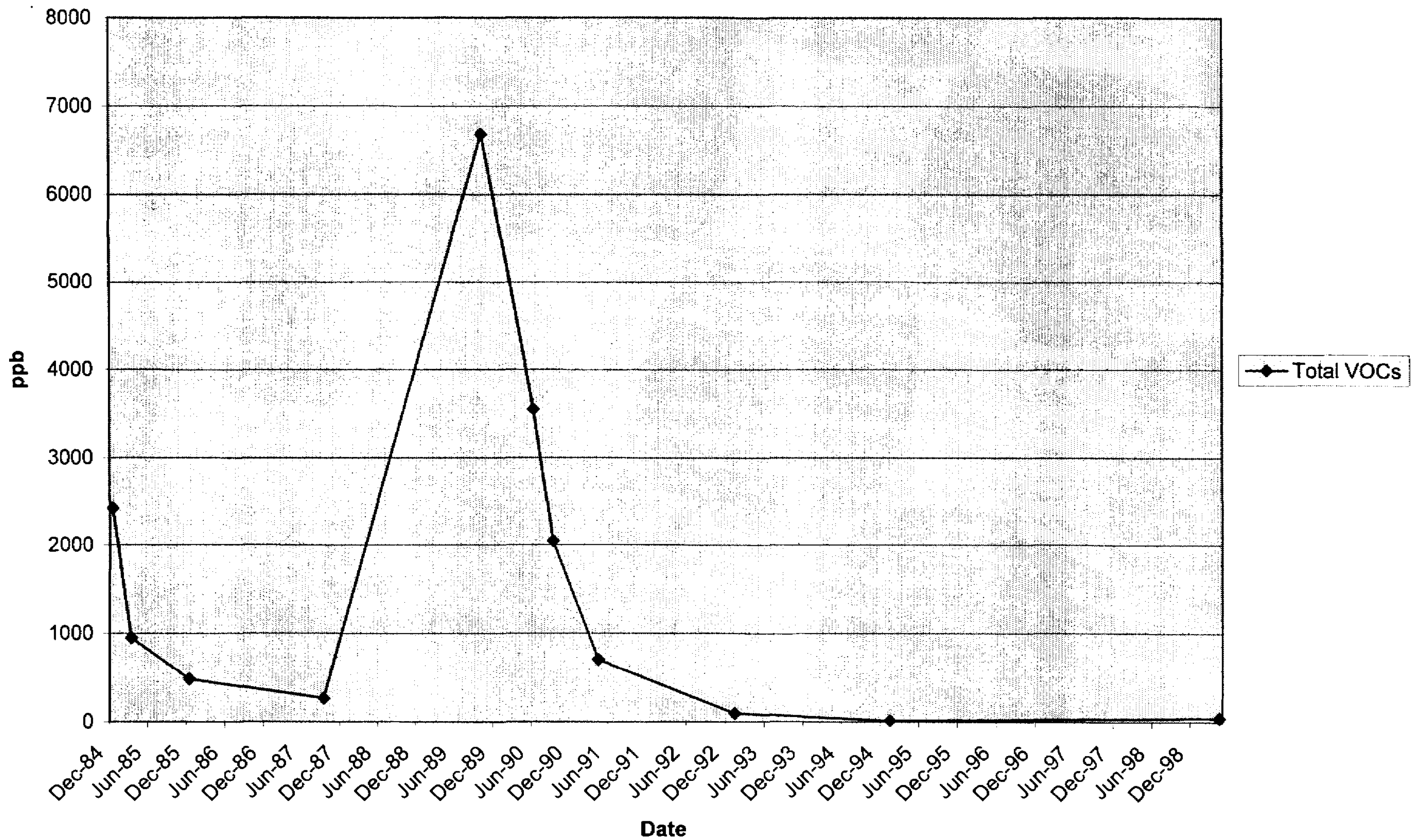


R2-0001156

N-10324 Total VOCs

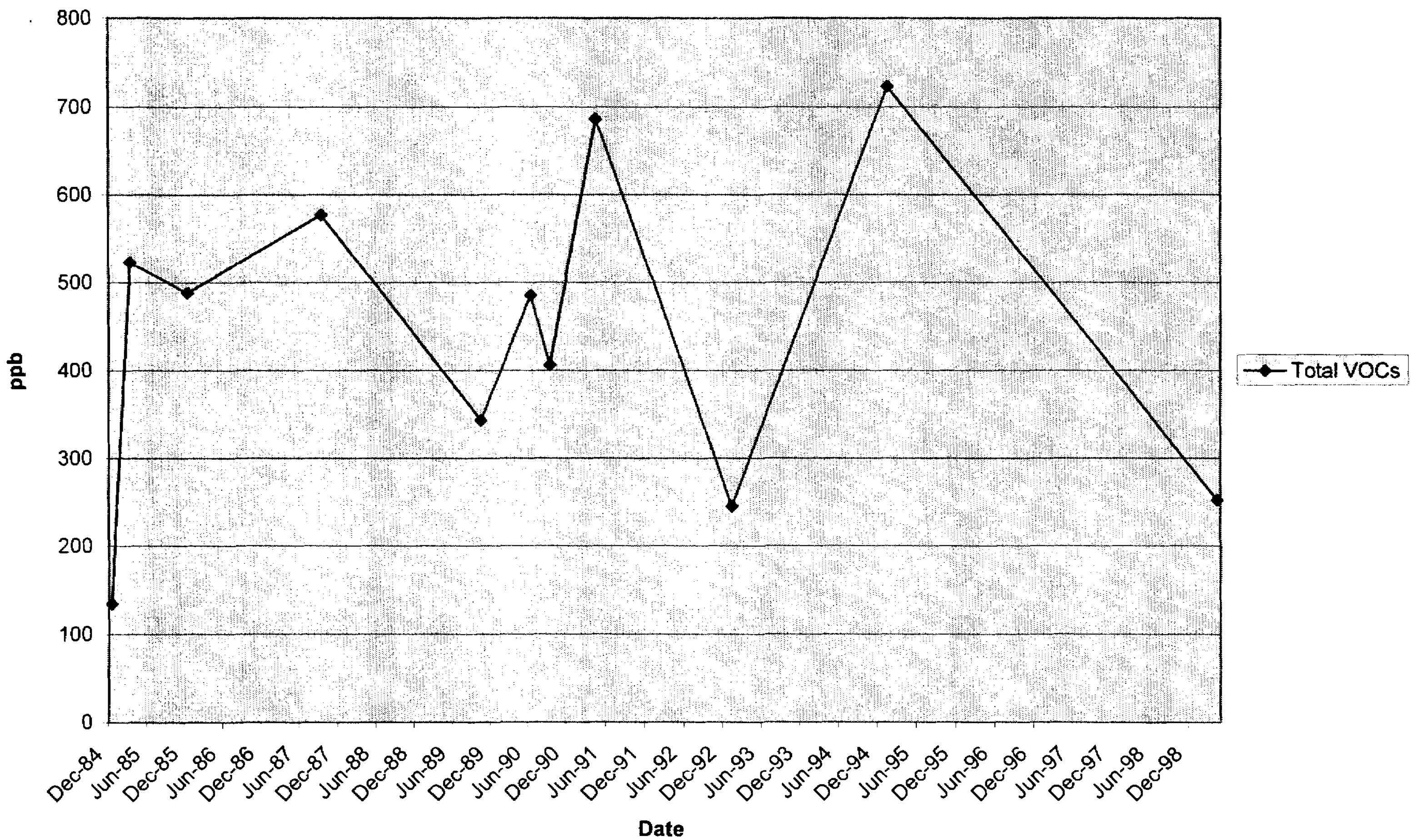


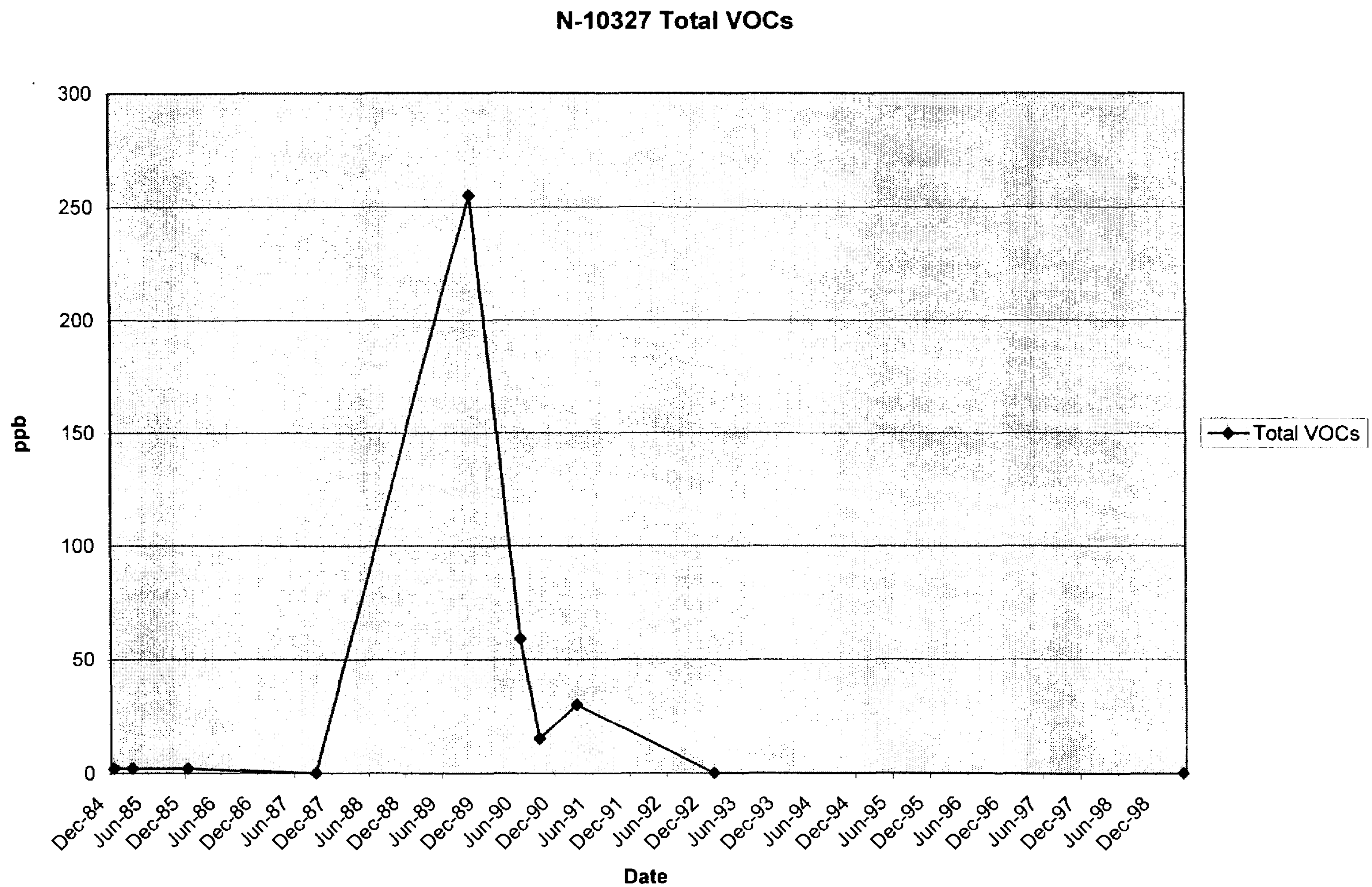
N-10325 Total VOCs



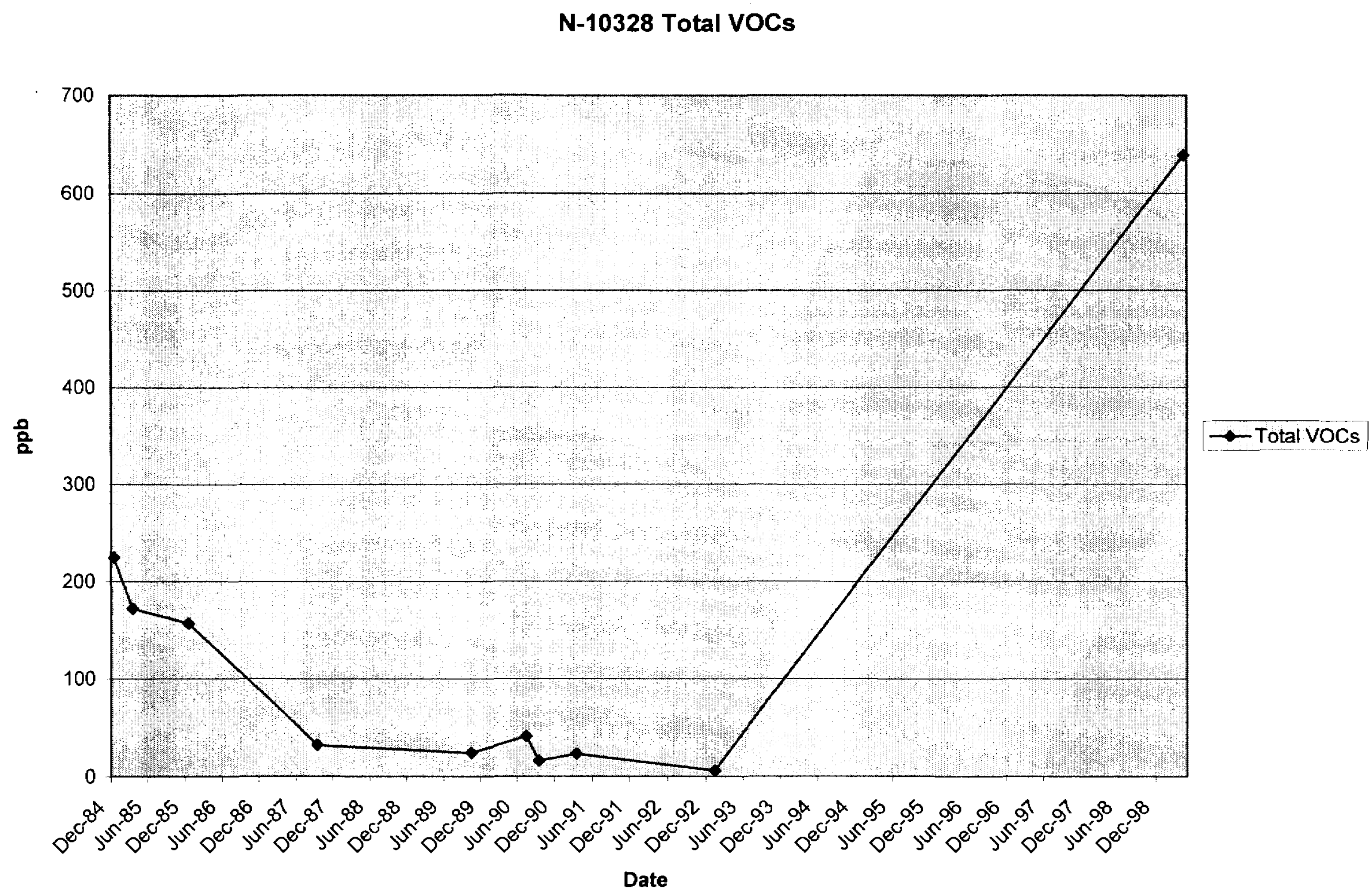
R2-0001158

N-10326 Total VOCs



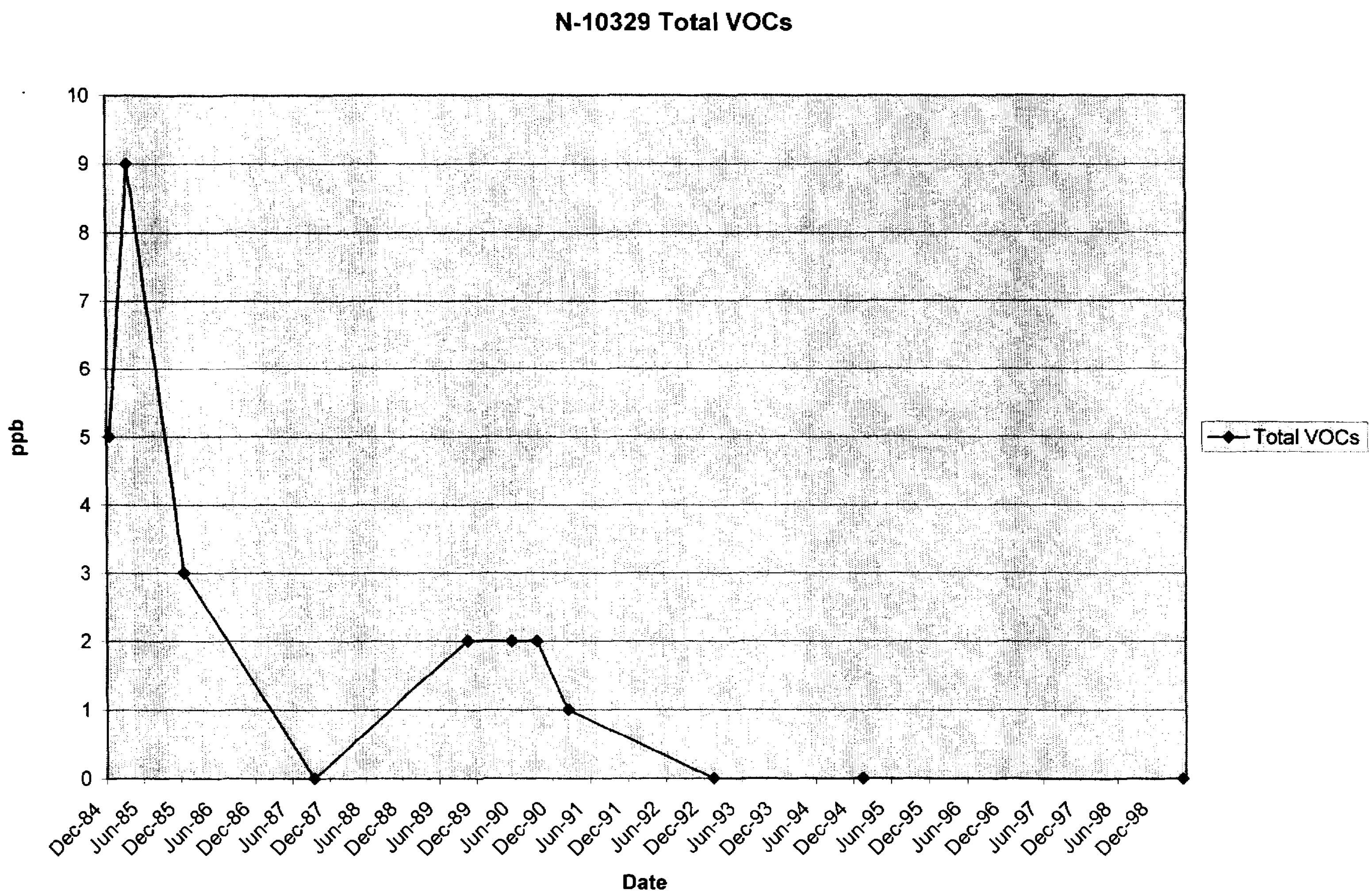

N-10327 Total VOCs
ppb
300
250
200
150
100
50
0
Dec-84
Jun-85
Dec-85
Jun-86
Dec-86
Jun-87
Dec-87
Jun-88
Dec-88
Jun-89
Dec-89
Jun-90
Dec-90
Jun-91
Dec-91
Jun-92
Dec-92
Jun-93
Dec-93
Jun-94
Dec-94
Jun-95
Dec-95
Jun-96
Dec-96
Jun-97
Dec-97
Jun-98
Dec-98
Date
Total VOCs

R2-0001160

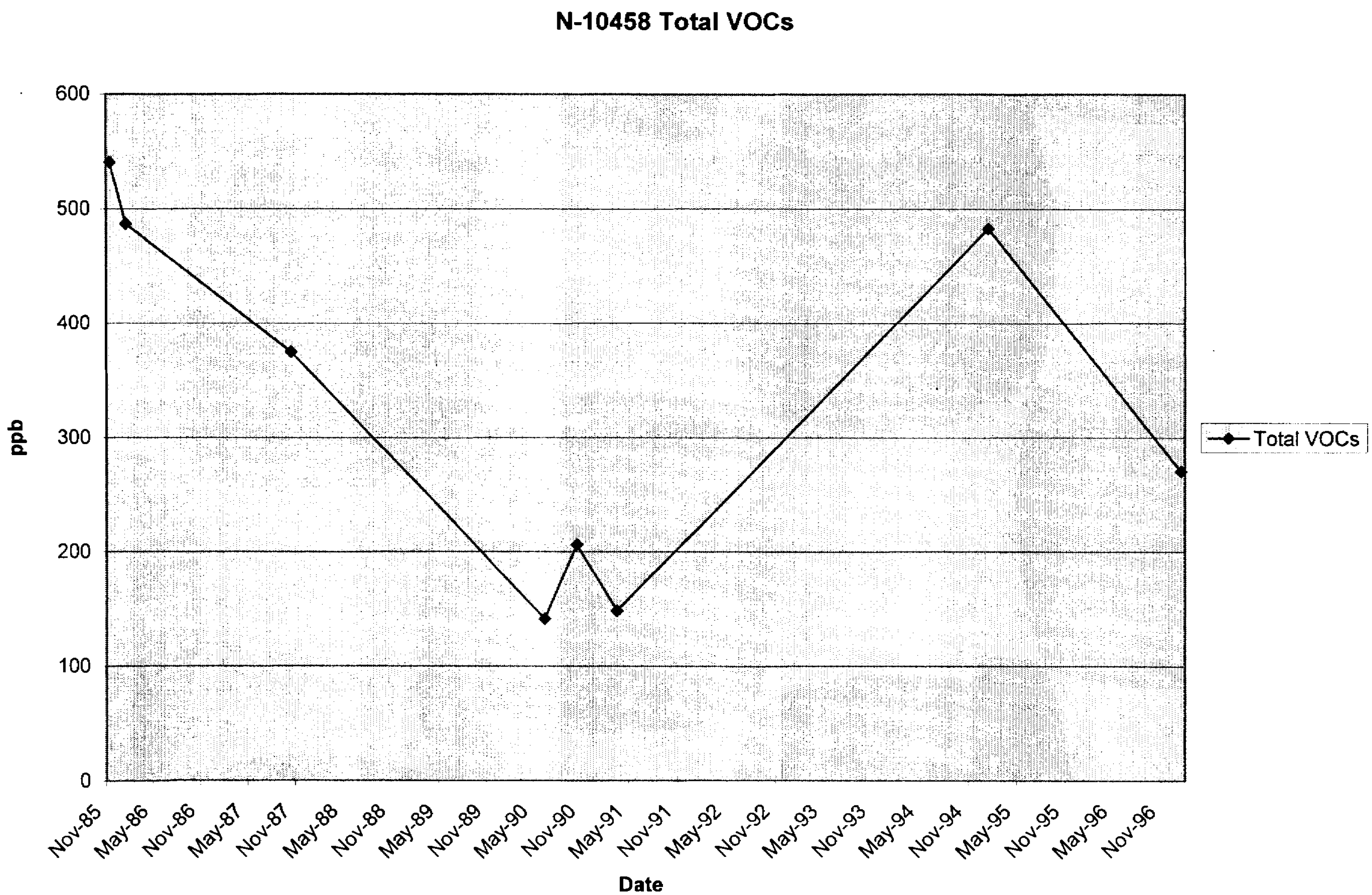


N-10328 Total VOCs
700
600
500
400
300
200
100
0
ppb
Total VOCs
Dec-84
Jun-85
Dec-85
Jun-86
Dec-86
Jun-87
Dec-87
Jun-88
Dec-88
Jun-89
Dec-89
Jun-90
Dec-90
Jun-91
Dec-91
Jun-92
Dec-92
Jun-93
Dec-93
Jun-94
Dec-94
Jun-95
Dec-95
Jun-96
Dec-96
Jun-97
Dec-97
Jun-98
Dec-98
Date

R2-0001161

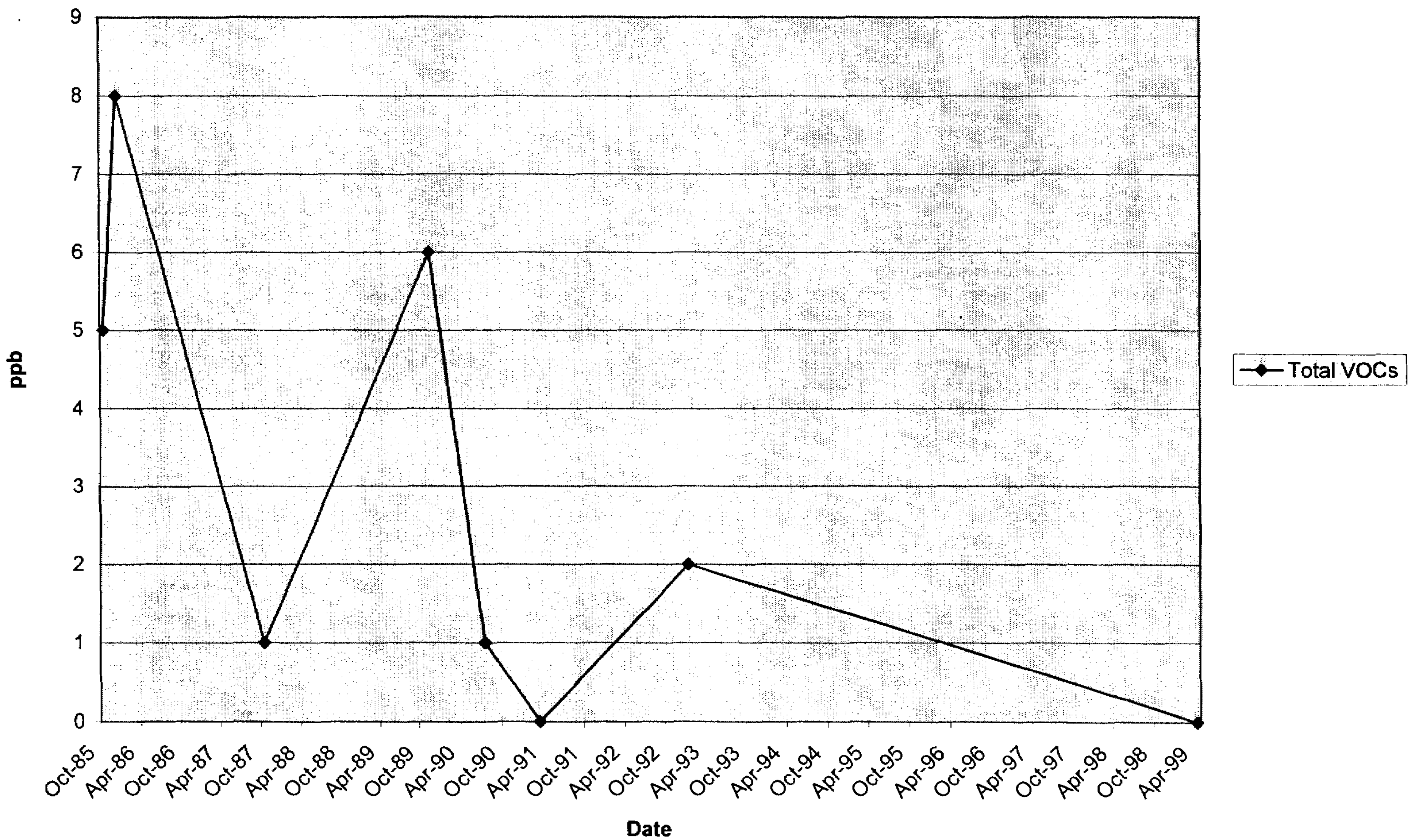


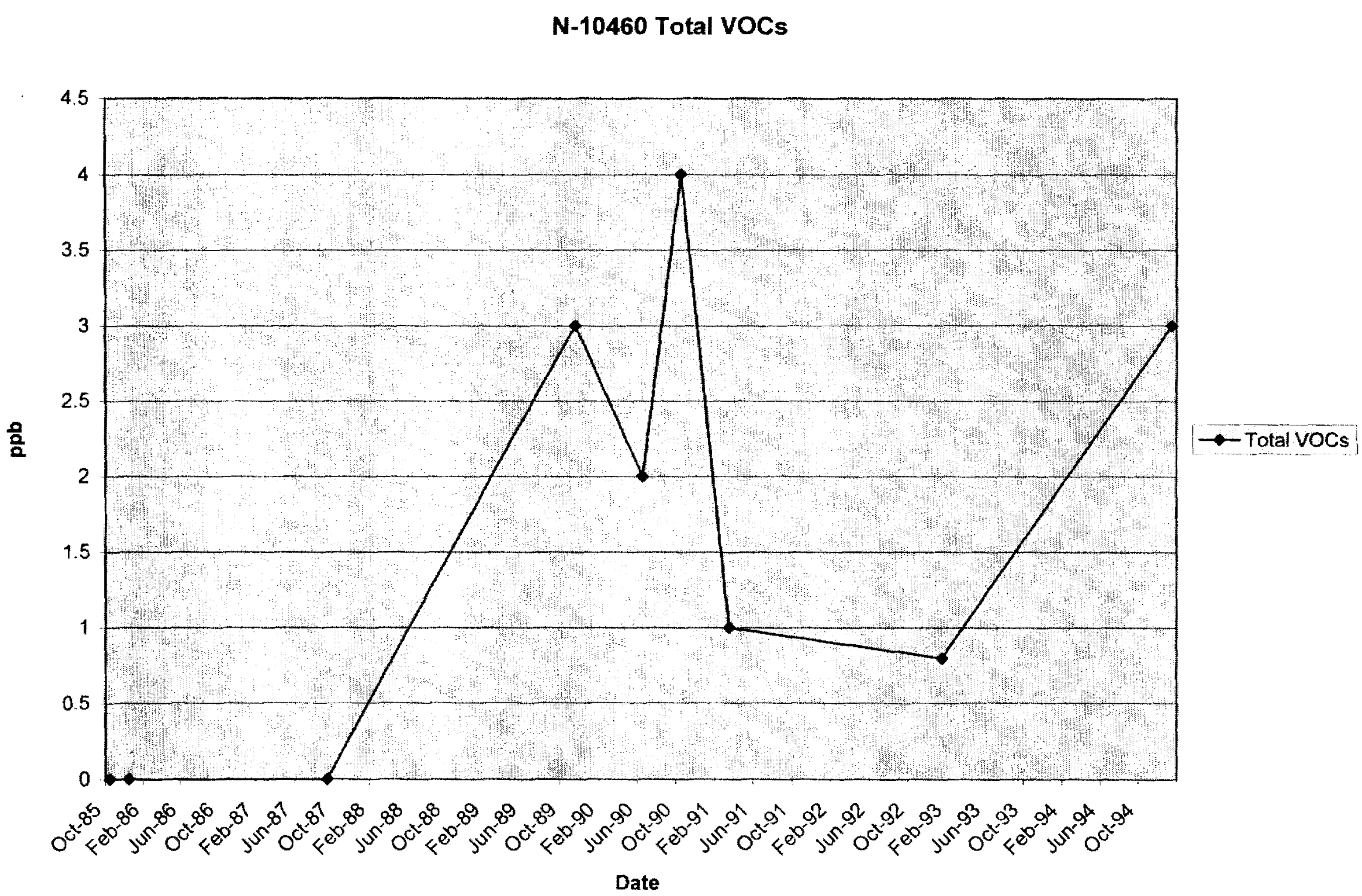
N-10329 Total VOCs
10
9
8
7
6
5
4
3
2
1
0
ppb
Total VOCs
Dec-84
Jun-85
Dec-85
Jun-86
Dec-86
Jun-87
Dec-87
Jun-88
Dec-88
Jun-89
Dec-89
Jun-90
Dec-90
Jun-91
Dec-91
Jun-92
Dec-92
Jun-93
Dec-93
Jun-94
Dec-94
Jun-95
Dec-95
Jun-96
Dec-96
Jun-97
Dec-97
Jun-98
Dec-98
Date


N-10458 Total VOCs
600
500
400
300
200
100
0
ppb
Nov-85
May-86
Nov-86
May-87
Nov-87
May-88
Nov-88
May-89
Nov-89
May-90
Nov-90
May-91
Nov-91
May-92
Nov-92
May-93
Nov-93
May-94
Nov-94
May-95
Nov-95
May-96
Nov-96
Date
Total VOCs

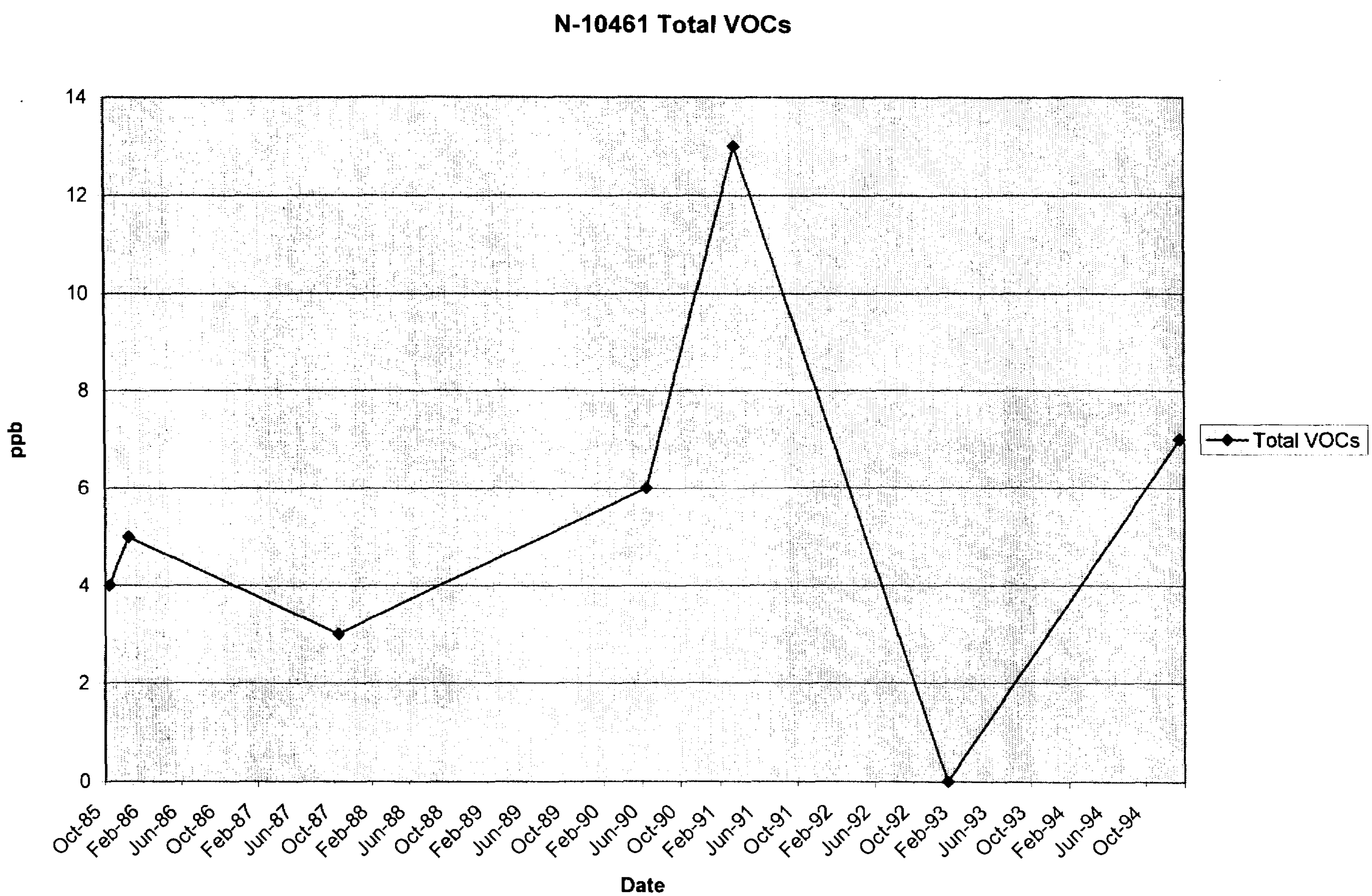
R2-0001163

N-10459 Total VOCs



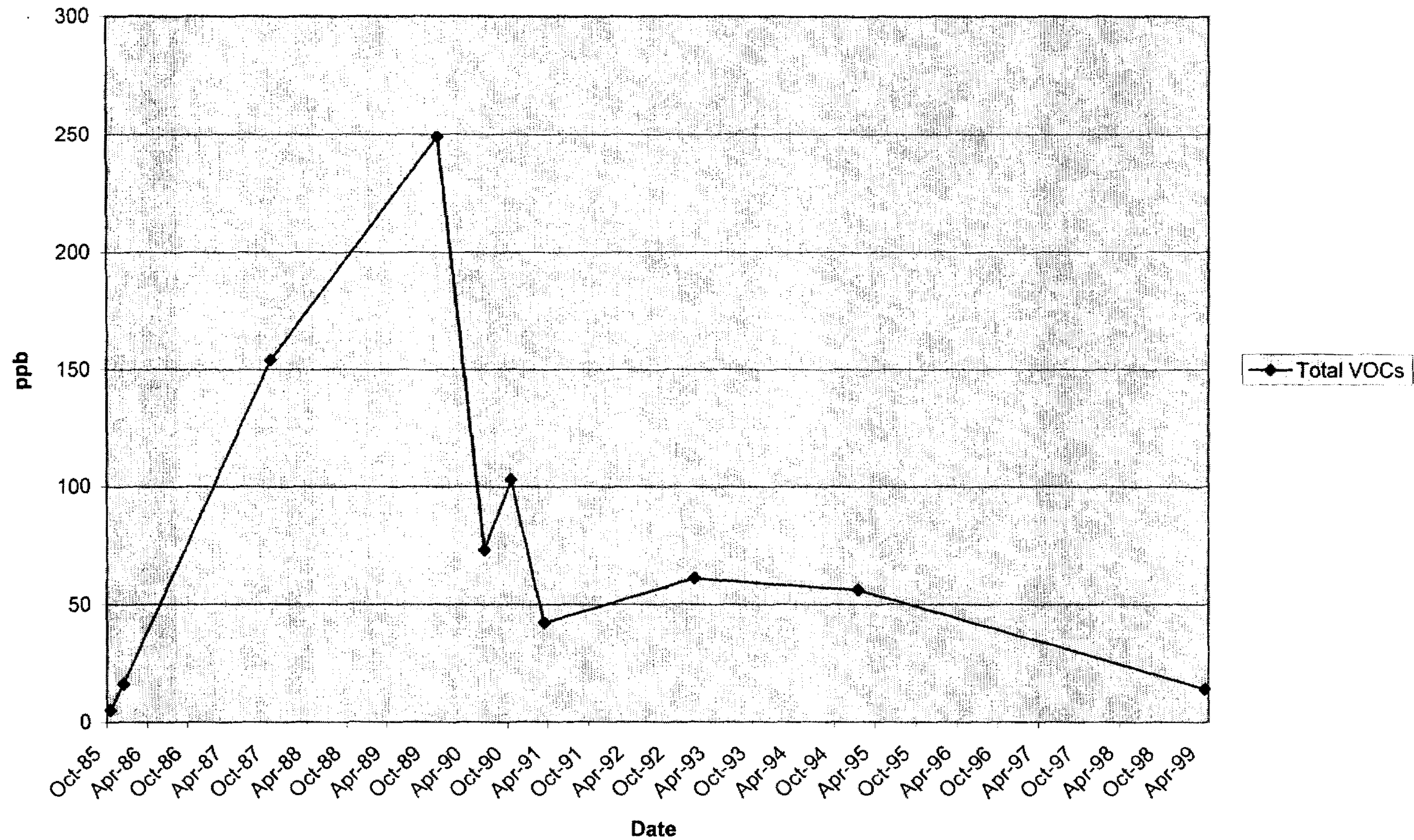


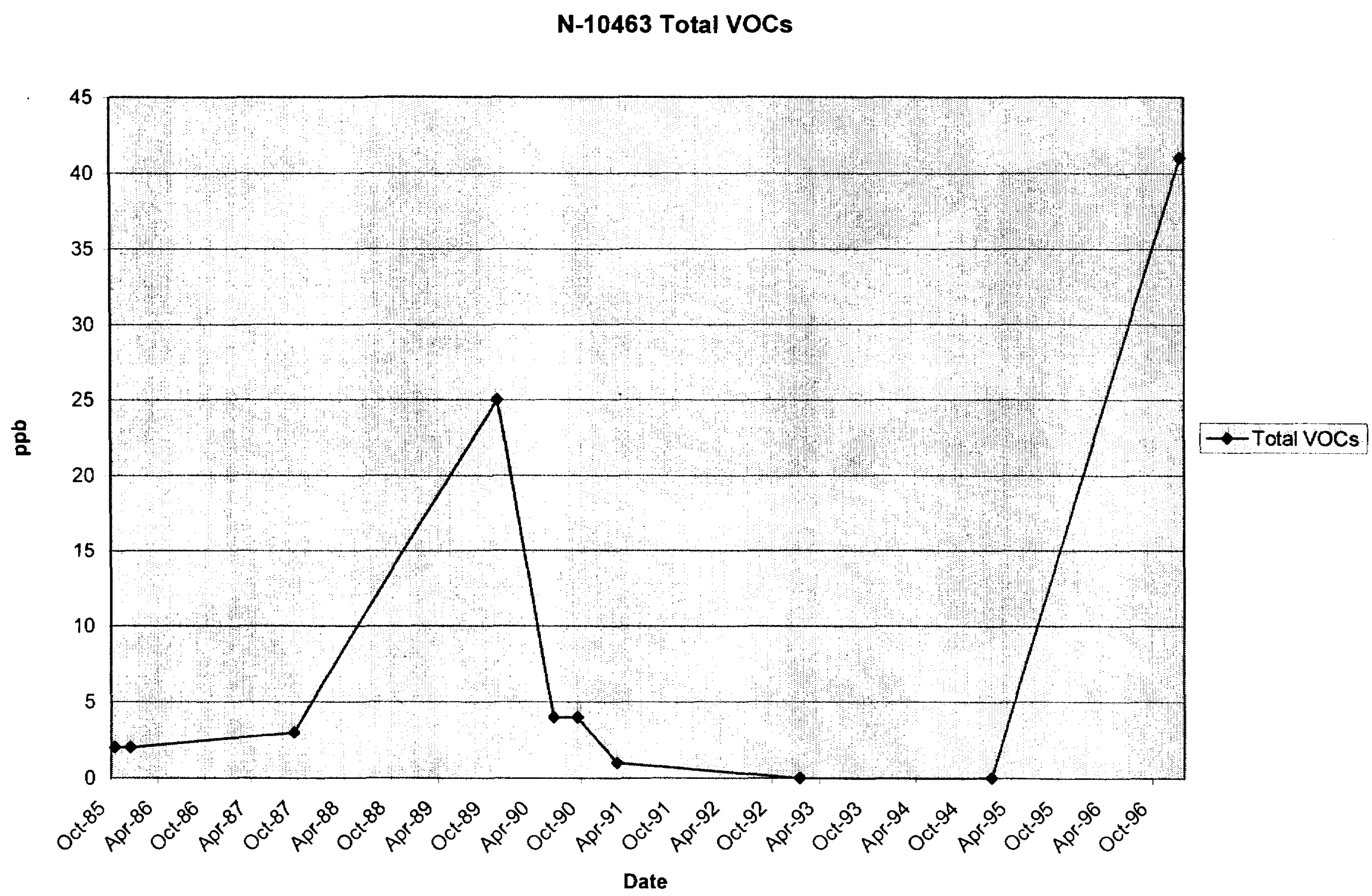
N-10460 Total VOCs
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
ppb
Oct-85
Feb-86
Jun-86
Oct-86
Feb-87
Jun-87
Oct-87
Feb-88
Jun-88
Oct-88
Feb-89
Jun-89
Oct-89
Feb-90
Jun-90
Oct-90
Feb-91
Jun-91
Oct-91
Feb-92
Jun-92
Oct-92
Feb-93
Jun-93
Oct-93
Feb-94
Jun-94
Oct-94
Date
Total VOCs

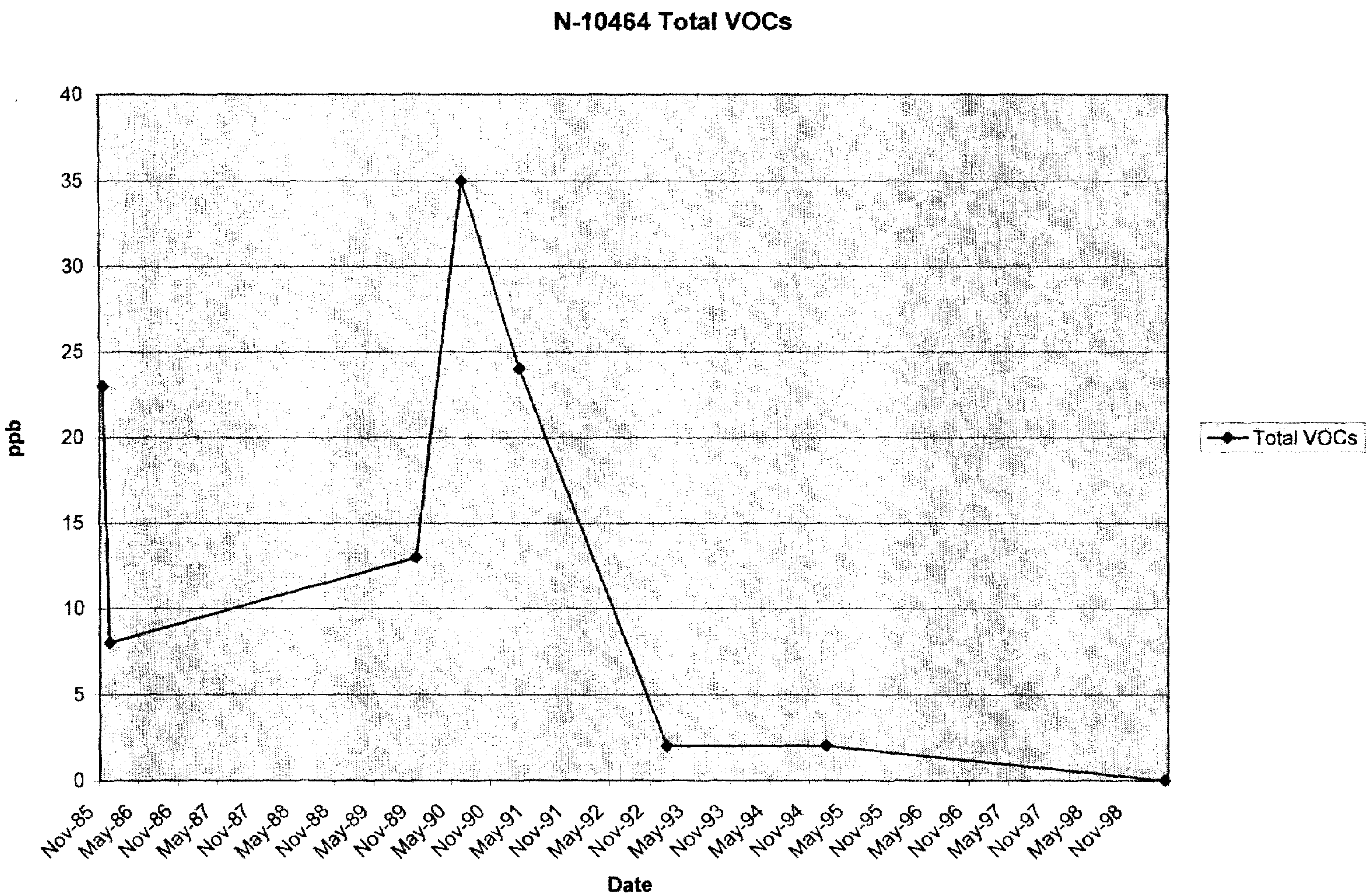


N-10461 Total VOCs
14
12
10
8
6
4
2
0
ppb
Oct-85
Feb-86
Jun-86
Oct-86
Feb-87
Jun-87
Oct-87
Feb-88
Jun-88
Oct-88
Feb-89
Jun-89
Oct-89
Feb-90
Jun-90
Oct-90
Feb-91
Jun-91
Oct-91
Feb-92
Jun-92
Oct-92
Feb-93
Jun-93
Oct-93
Feb-94
Jun-94
Oct-94
Date
Total VOCs

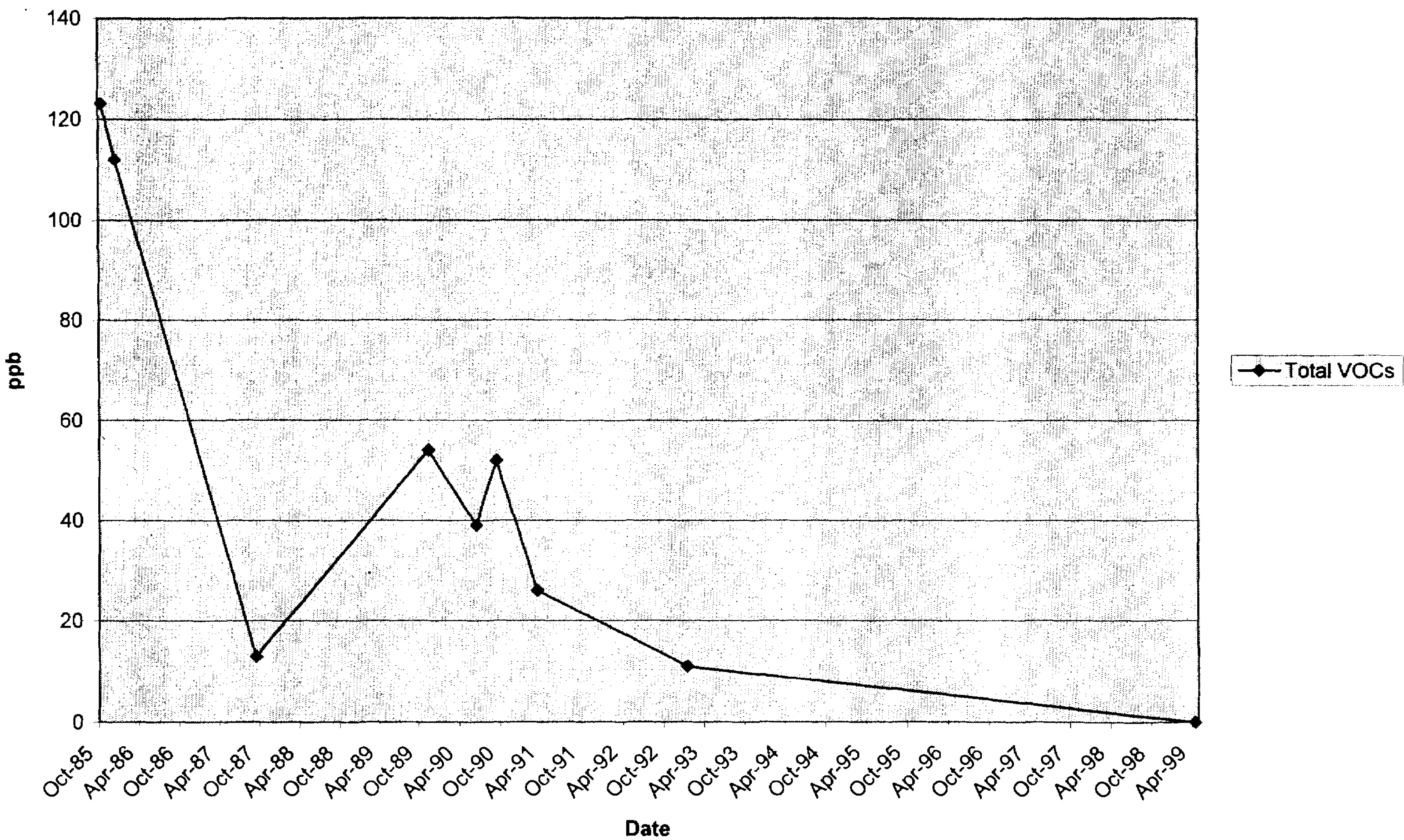
N-10462 Total VOCs




N-10463 Total VOCs
ppb
45
40
35
30
25
20
15
10
5
0
Oct-85
Apr-86
Oct-86
Apr-87
Oct-87
Apr-88
Oct-88
Apr-89
Oct-89
Apr-90
Oct-90
Apr-91
Oct-91
Apr-92
Oct-92
Apr-93
Oct-93
Apr-94
Oct-94
Apr-95
Oct-95
Apr-96
Oct-96
Date
Total VOCs

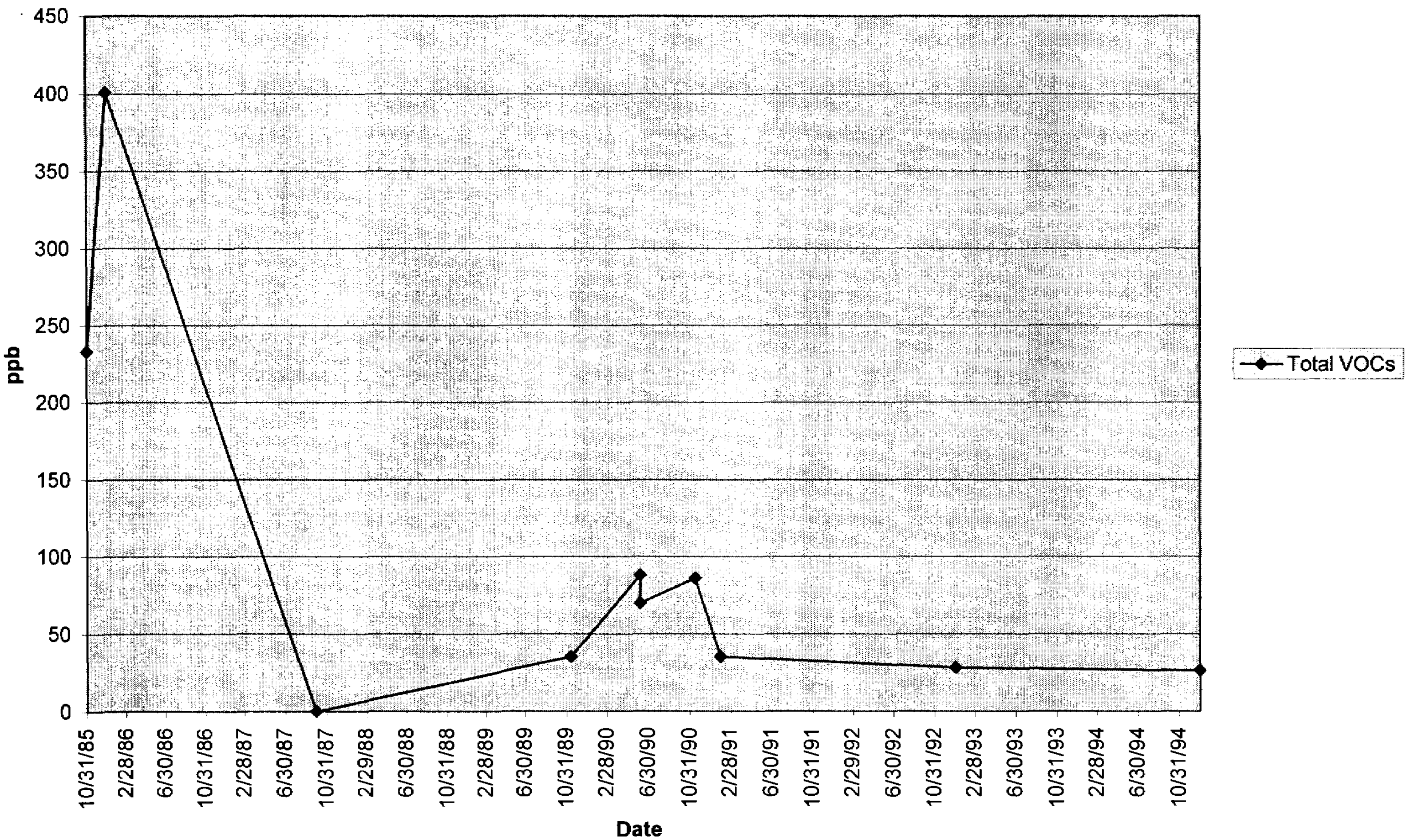

N-10464 Total VOCs
ppb
40
35
30
25
20
15
10
5
0
Nov-85
May-86
Nov-86
May-87
Nov-87
May-88
Nov-88
May-89
Nov-89
May-90
Nov-90
May-91
Nov-91
May-92
Nov-92
May-93
Nov-93
May-94
Nov-94
May-95
Nov-95
May-96
Nov-96
May-97
Nov-97
May-98
Nov-98
Date
Total VOCs

N-10465 Total VOCs



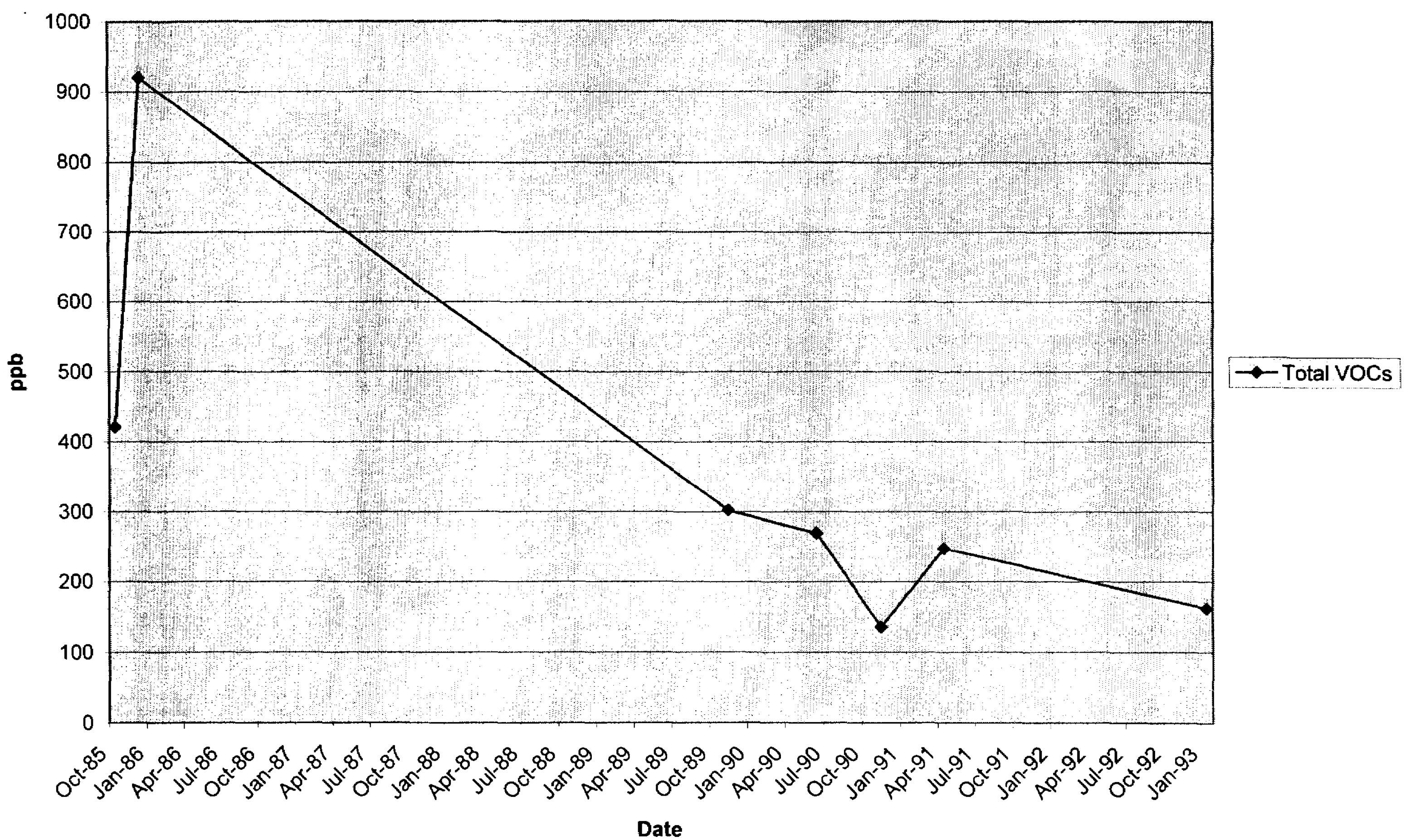
R2-0001170

N-10466 Total VOCs

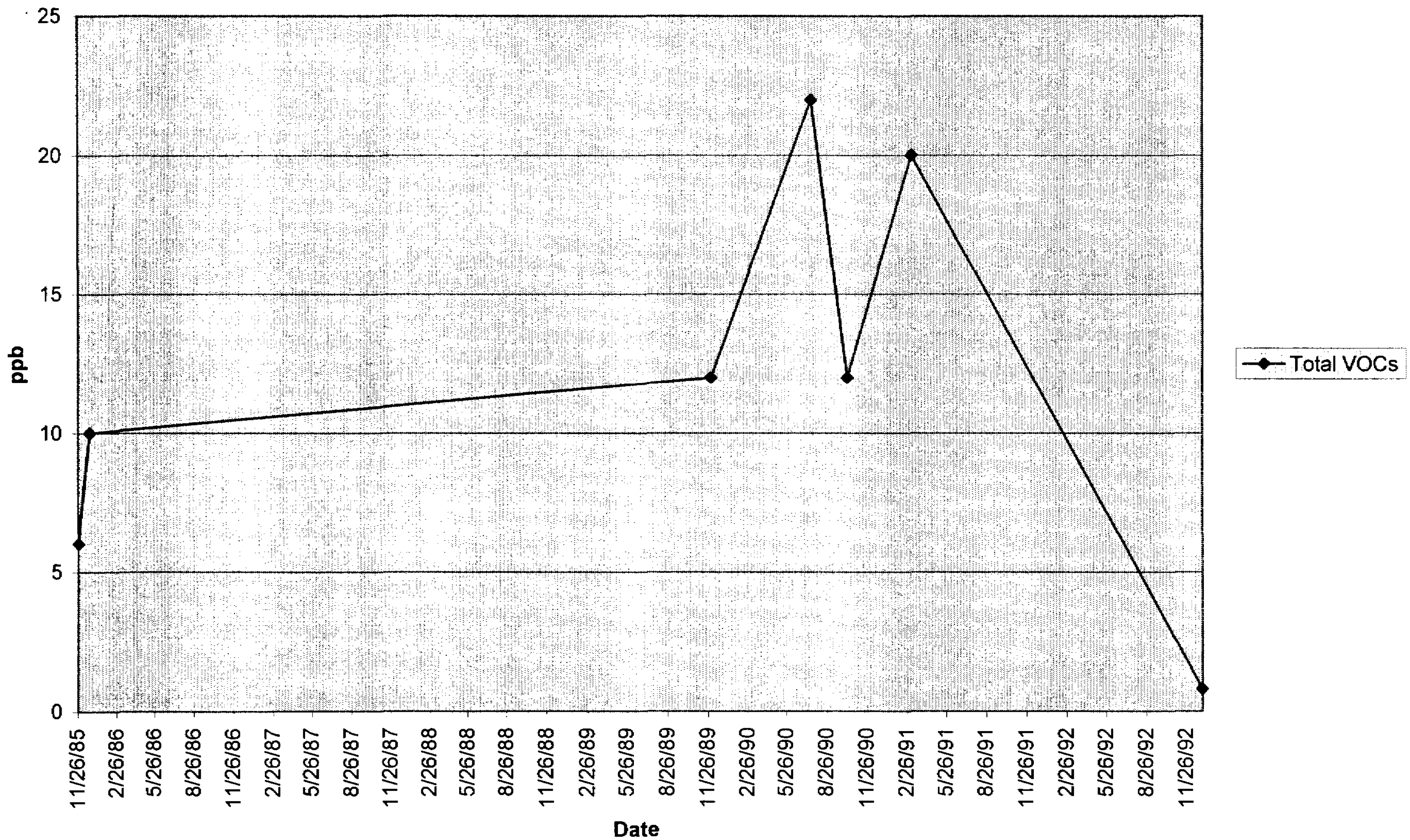


R2-0001171

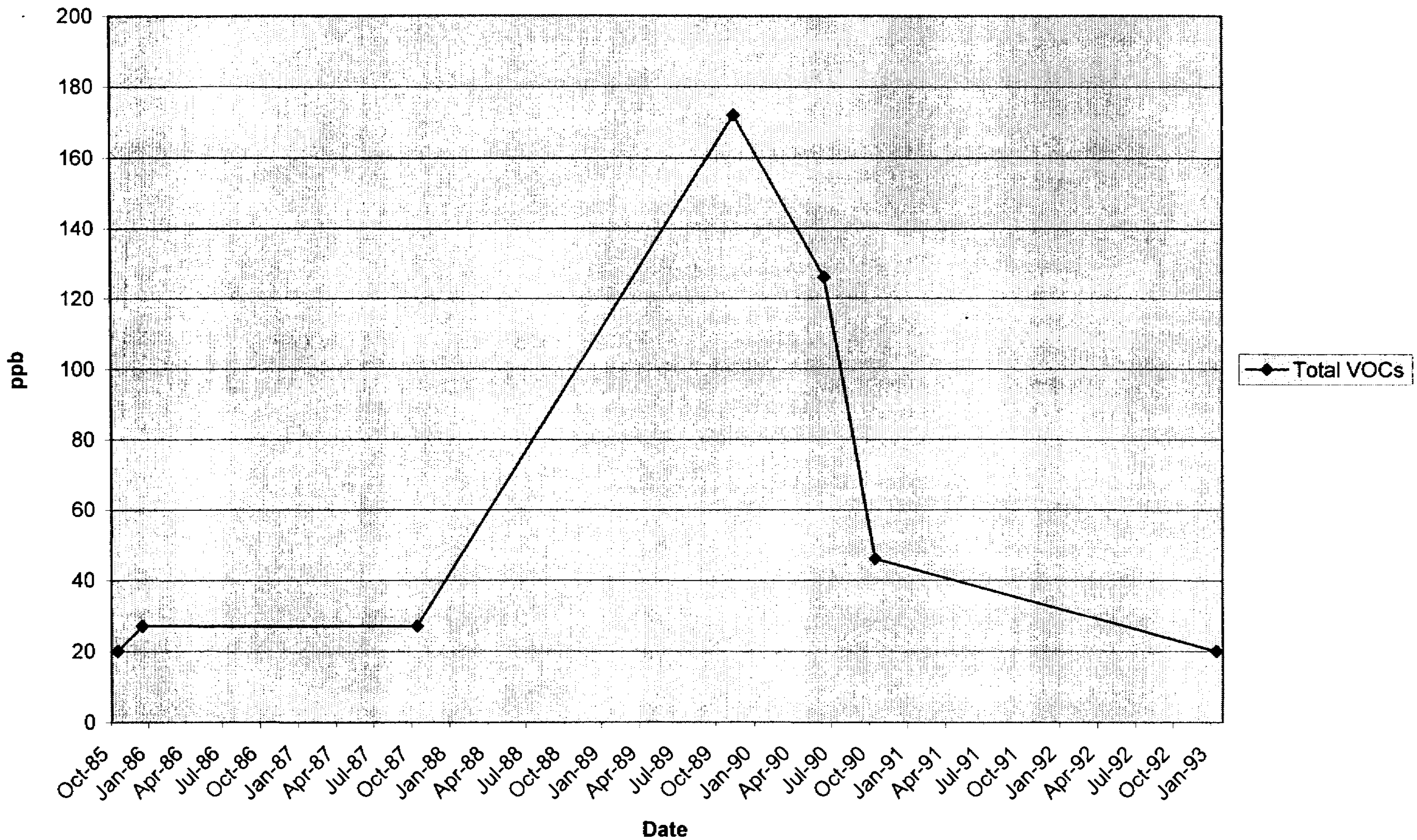
N-10467 Total VOCs



N-10468 Total VOCs

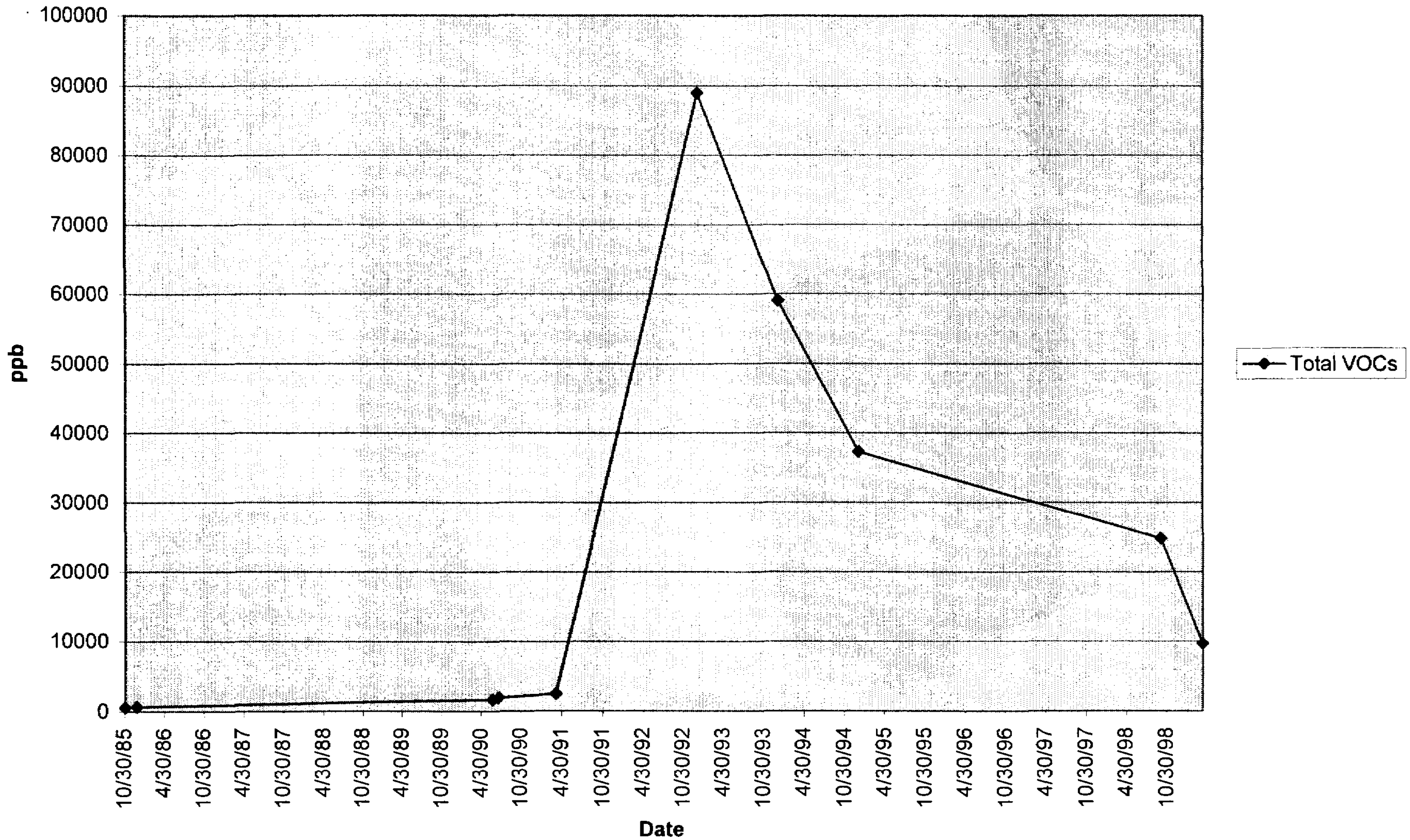


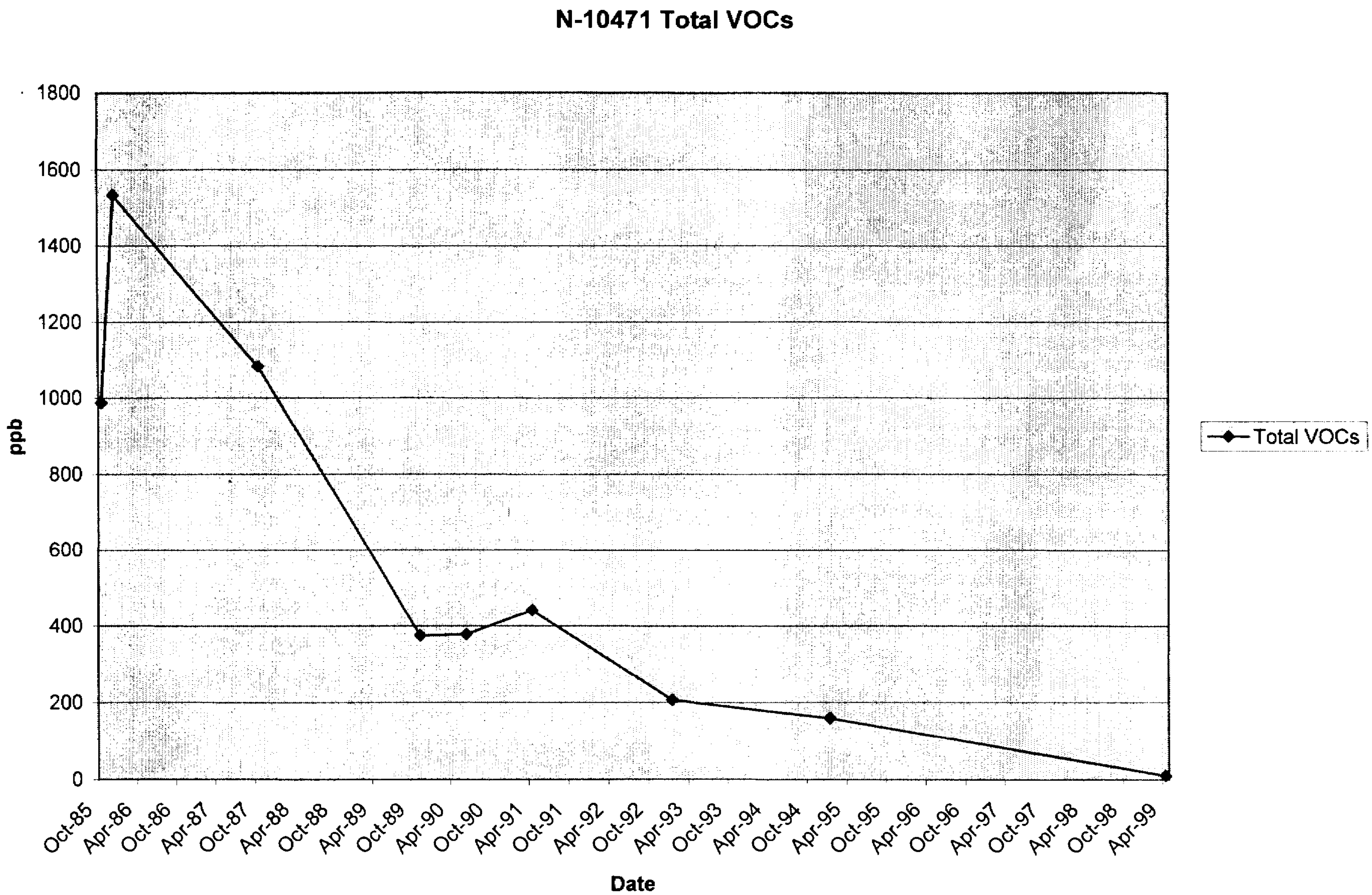
N-10469 Total VOCs



R2-0001174

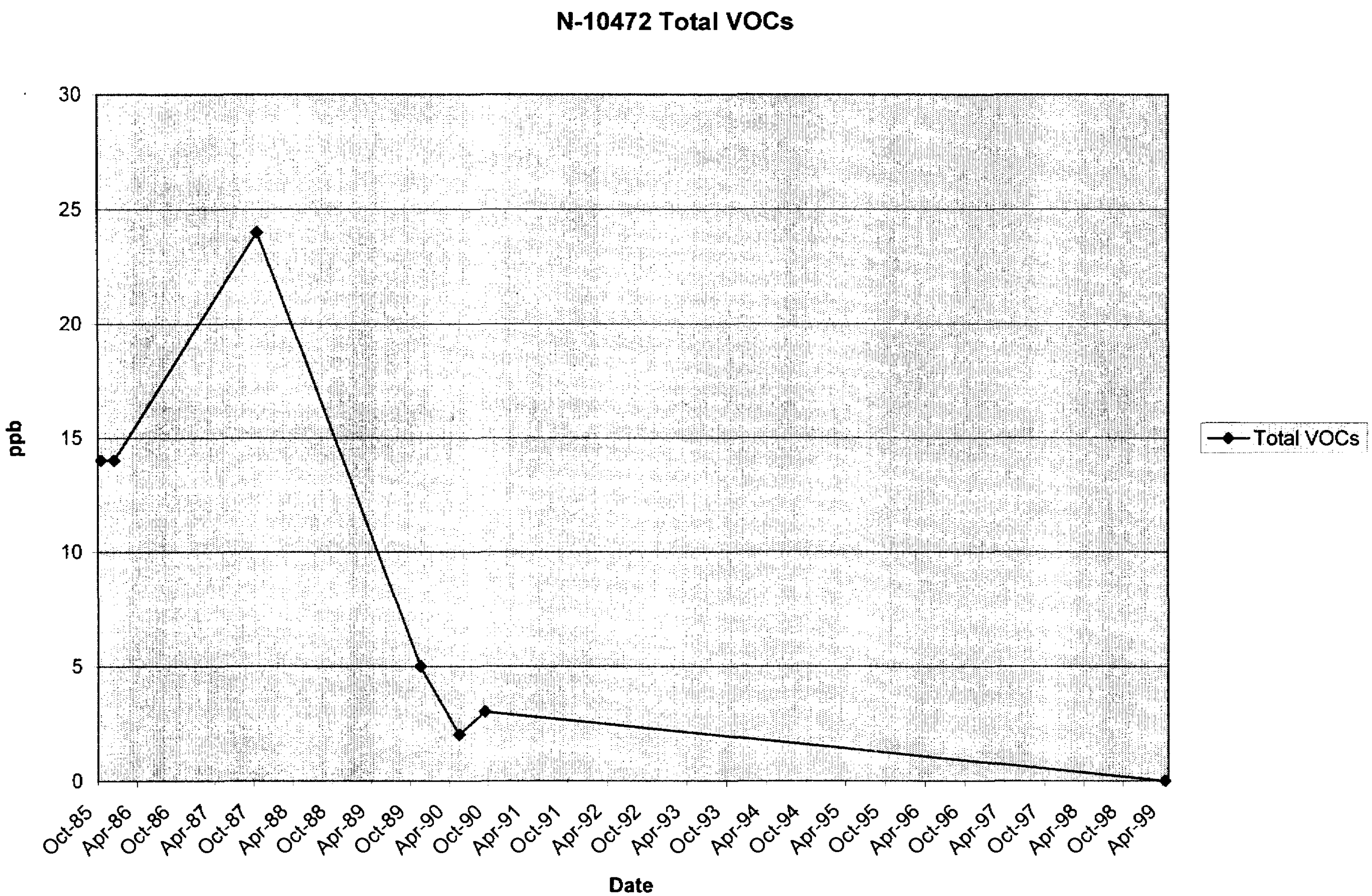
N-10470 Total VOCs





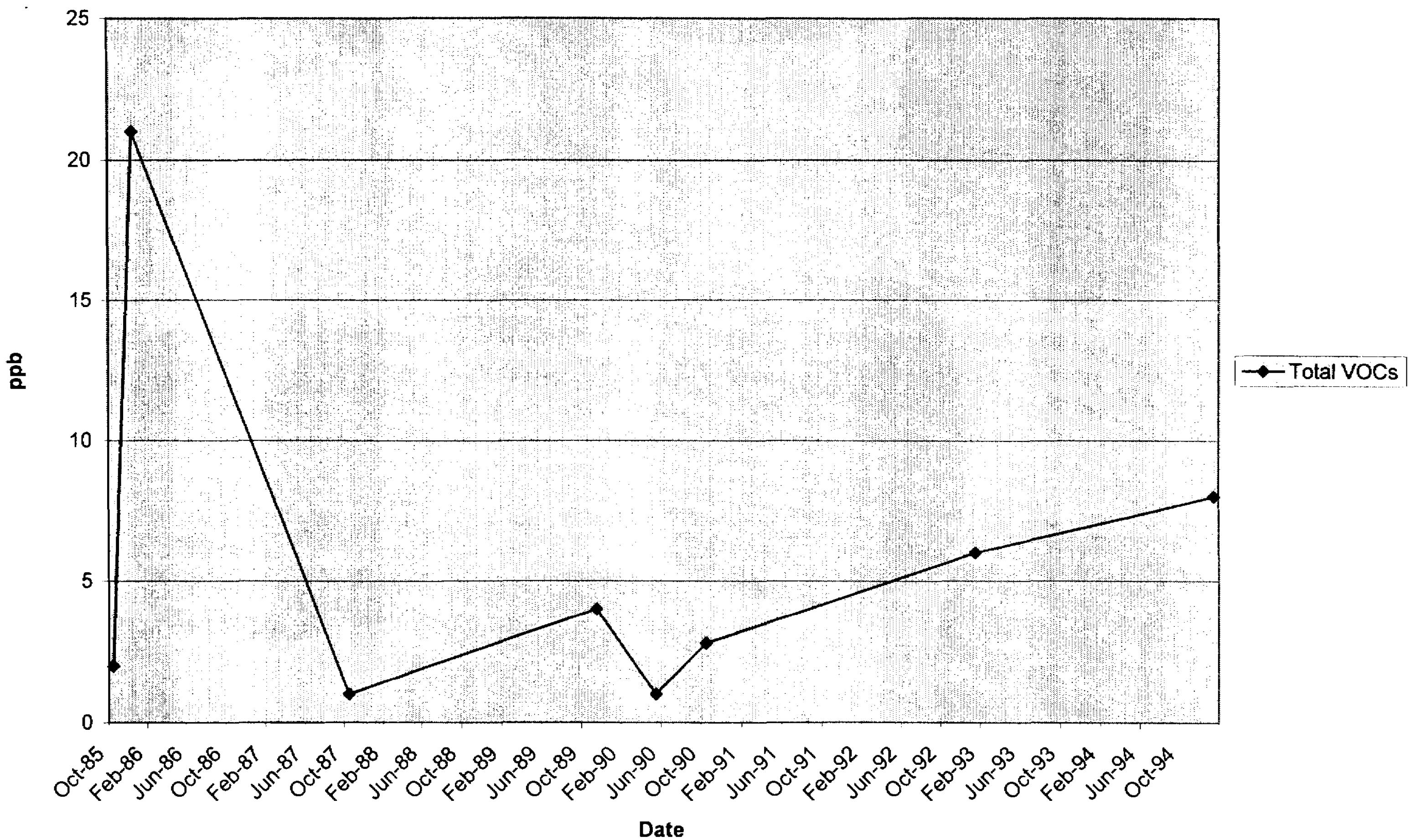
N-10471 Total VOCs
1800
1600
1400
1200
1000
800
600
400
200
0
ppb
Oct-85
Apr-86
Oct-86
Apr-87
Oct-87
Apr-88
Oct-88
Apr-89
Oct-89
Apr-90
Oct-90
Apr-91
Oct-91
Apr-92
Oct-92
Apr-93
Oct-93
Apr-94
Oct-94
Apr-95
Oct-95
Apr-96
Oct-96
Apr-97
Oct-97
Apr-98
Oct-98
Apr-99
Date
Total VOCs

R2-0001176


N-10472 Total VOCs
30
25
20
15
10
5
0
ppb
Oct-85
Apr-86
Oct-86
Apr-87
Oct-87
Apr-88
Oct-88
Apr-89
Oct-89
Apr-90
Oct-90
Apr-91
Oct-91
Apr-92
Oct-92
Apr-93
Oct-93
Apr-94
Oct-94
Apr-95
Oct-95
Apr-96
Oct-96
Apr-97
Oct-97
Apr-98
Oct-98
Apr-99
Date
Total VOCs

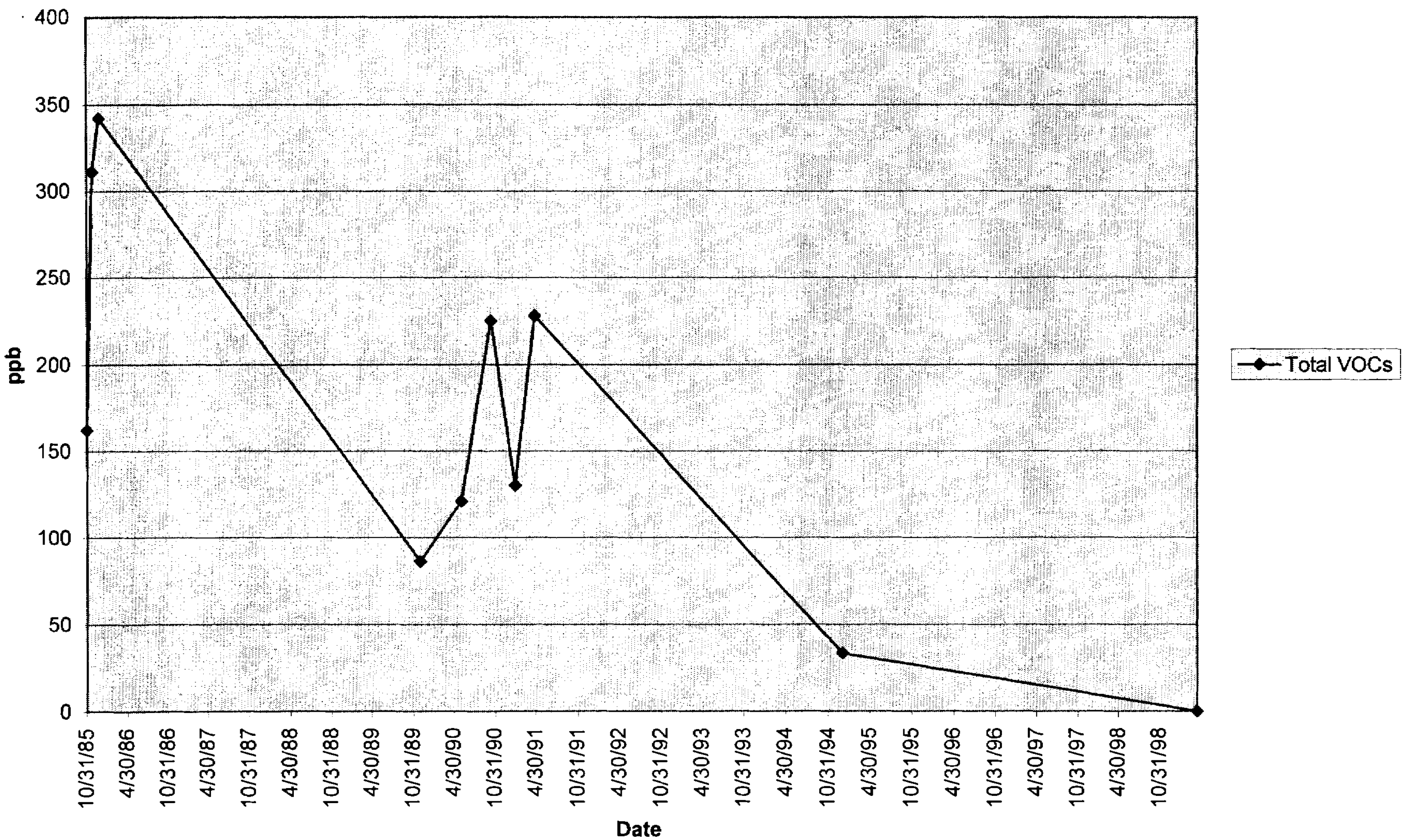
R2-0001177

N-10473 Total VOCs

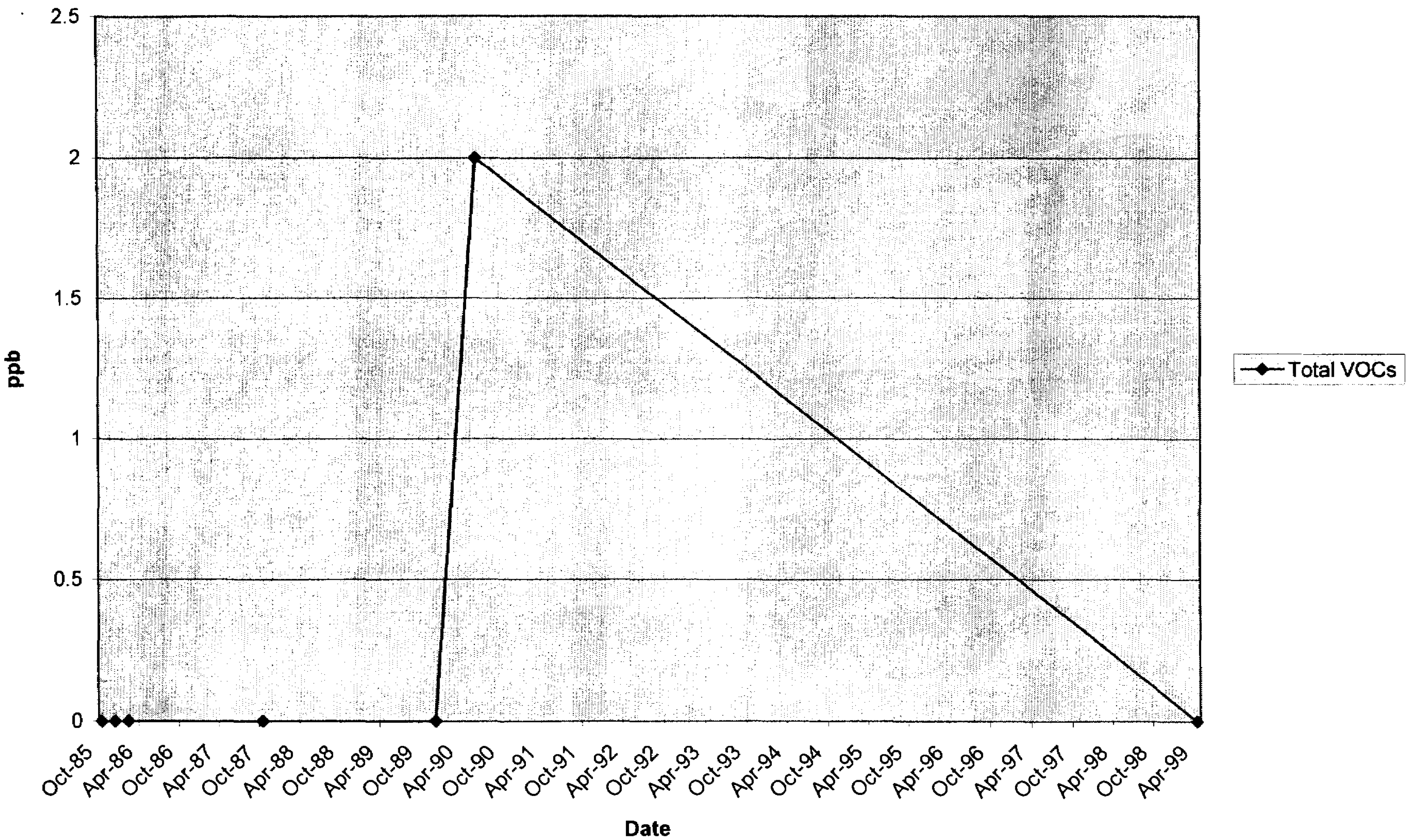


R2-0001178

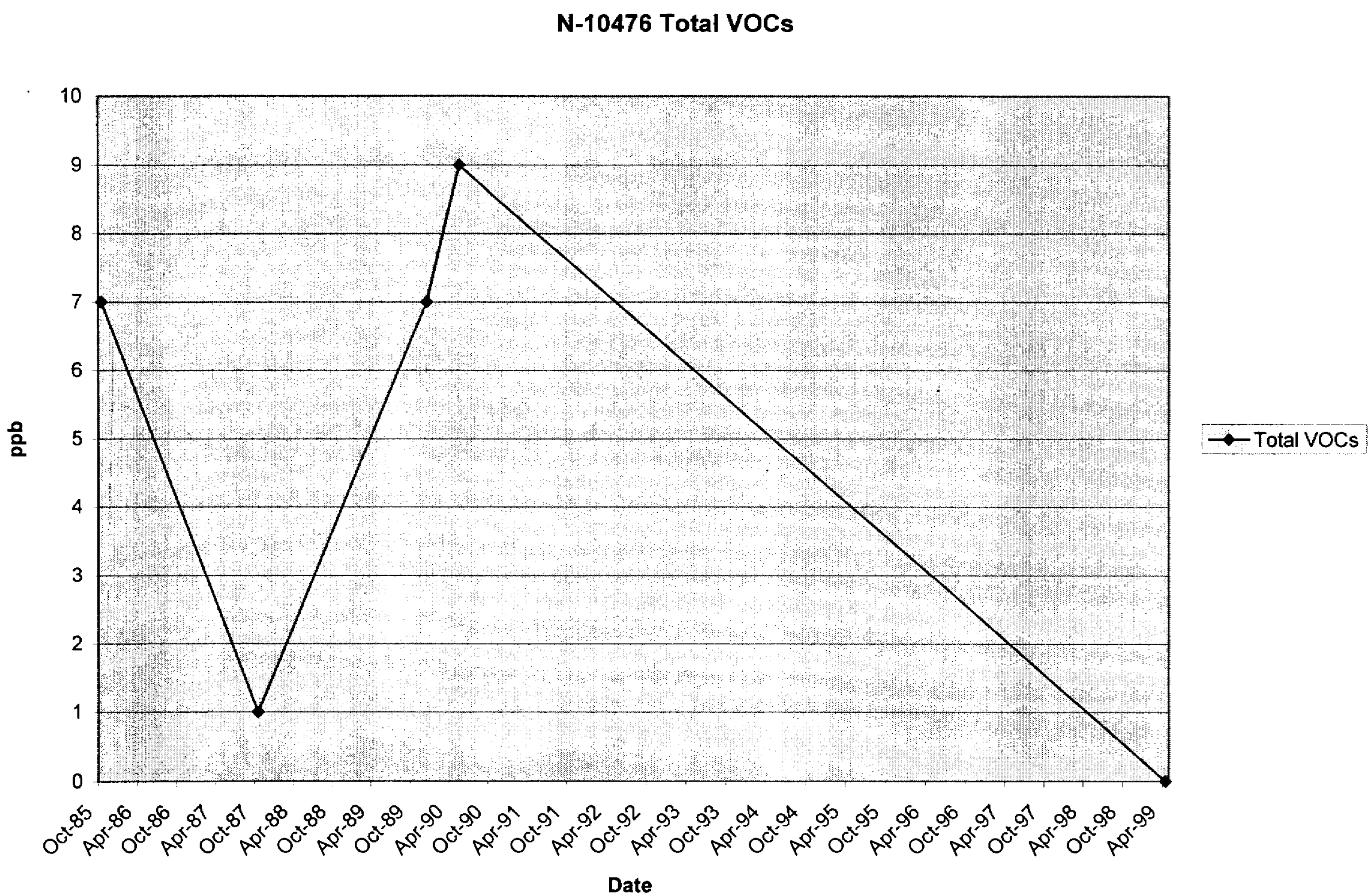
N-10474 Total VOCs



N-10475 Total VOCs



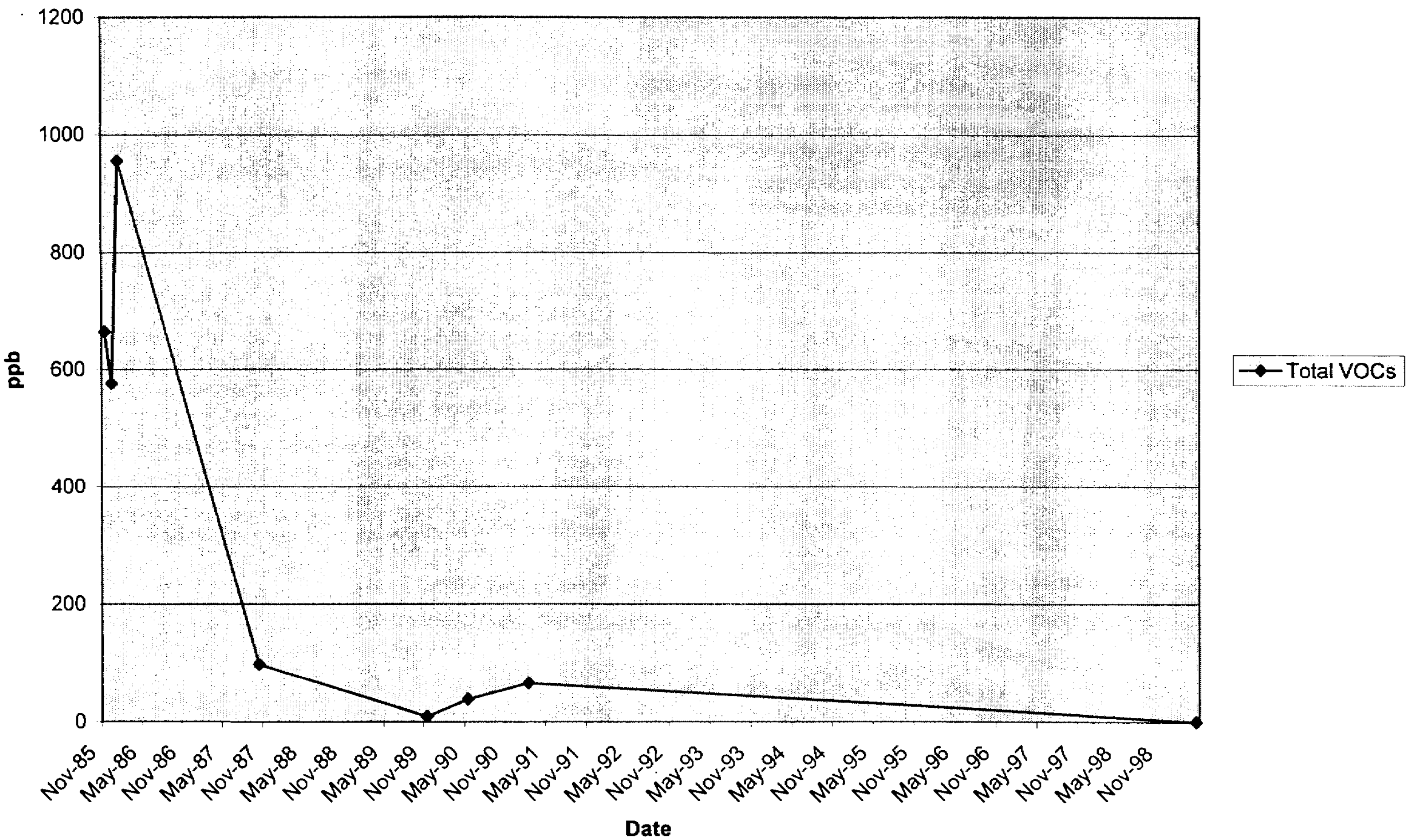
R2-0001180



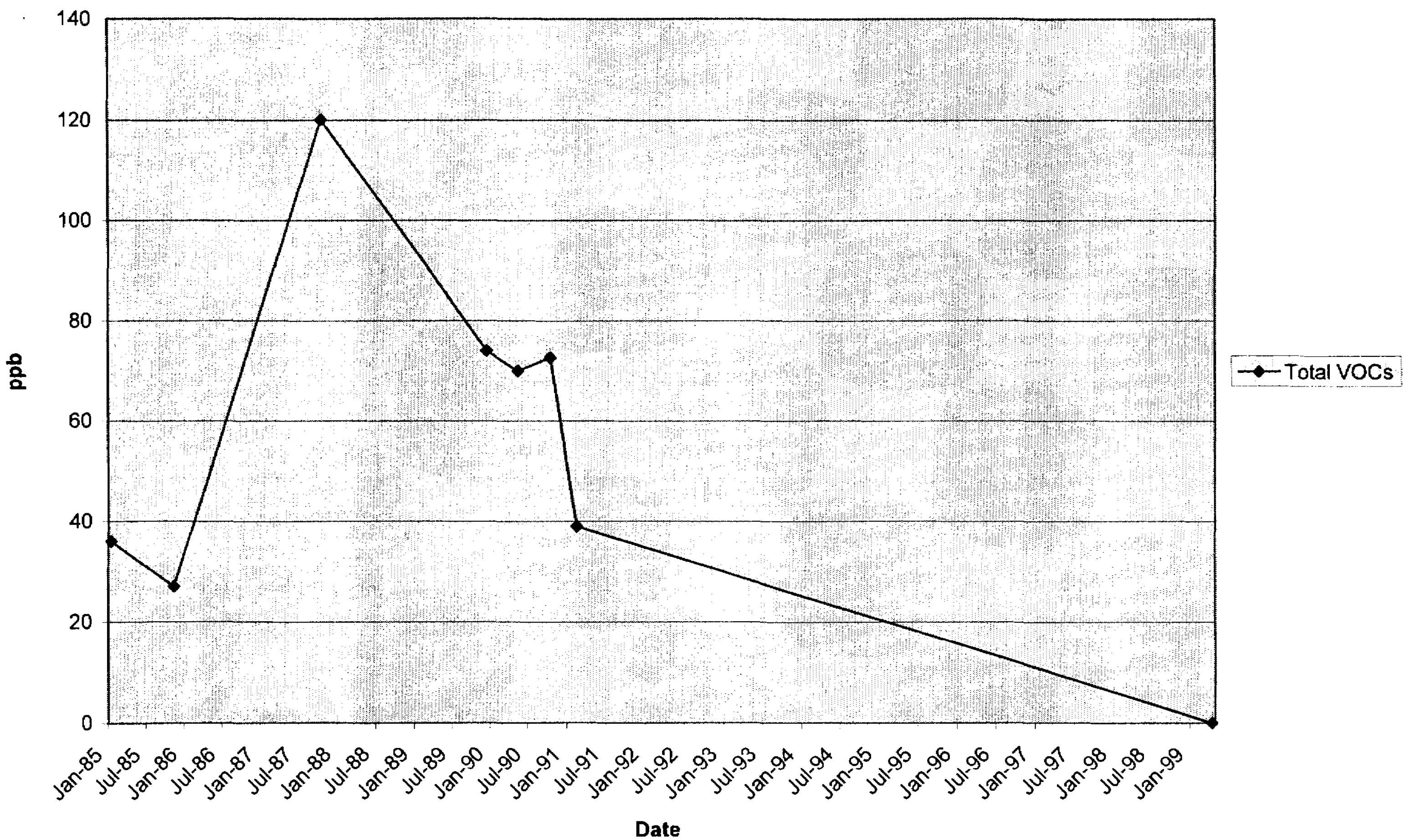
N-10476 Total VOCs
ppb
10
9
8
7
6
5
4
3
2
1
0
Oct-85
Apr-86
Oct-86
Apr-87
Oct-87
Apr-88
Oct-88
Apr-89
Oct-89
Apr-90
Oct-90
Apr-91
Oct-91
Apr-92
Oct-92
Apr-93
Oct-93
Apr-94
Oct-94
Apr-95
Oct-95
Apr-96
Oct-96
Apr-97
Oct-97
Apr-98
Oct-98
Apr-99
Date
Total VOCs

R2-0001181

N-10477 Total VOCs

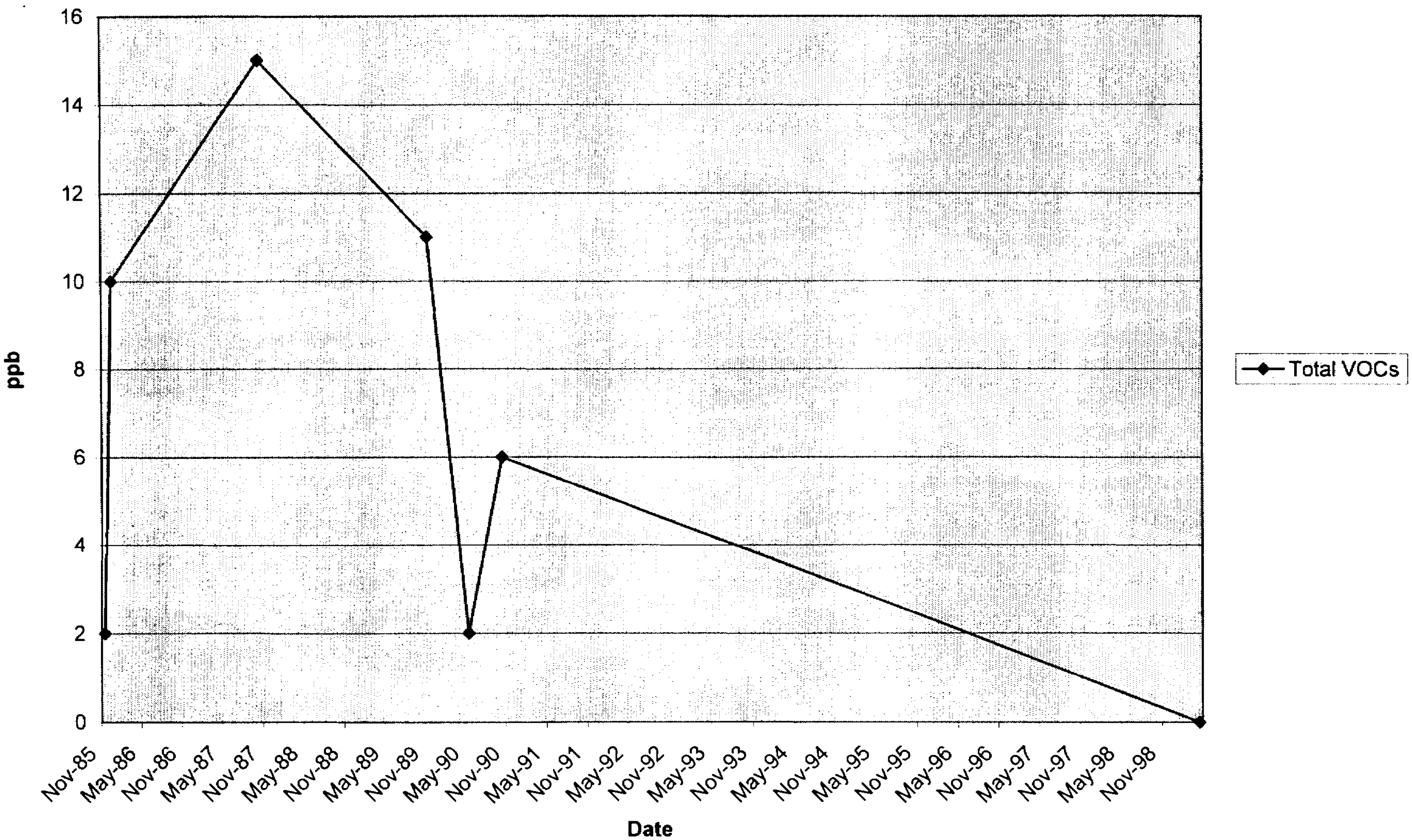


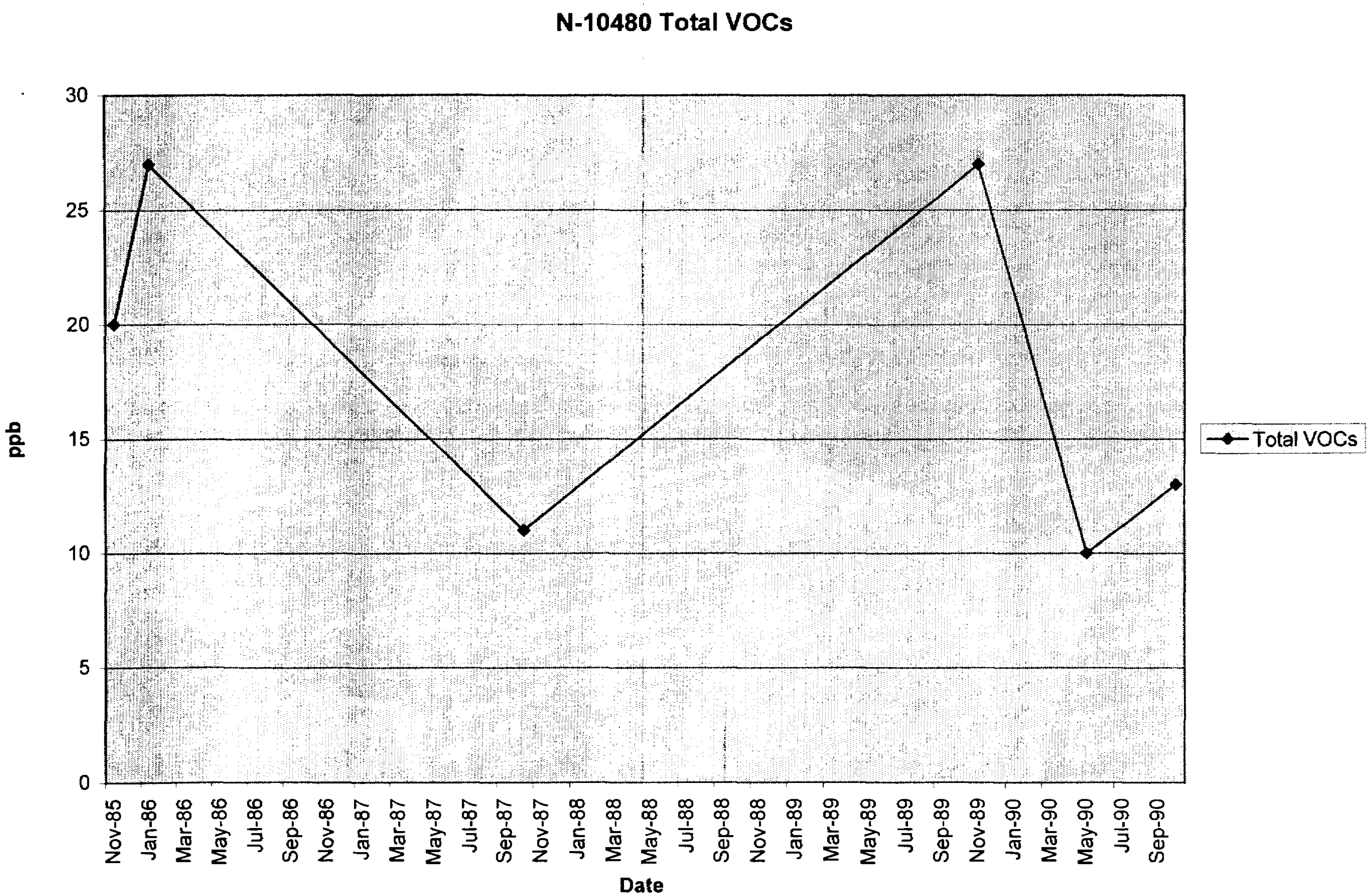
N-10478 Total VOCs



R2-0001183

N-10479 Total VOCs




N-10480 Total VOCs
30
25
20
15
10
5
0
ppb
Nov-85
Jan-86
Mar-86
May-86
Jul-86
Sep-86
Nov-86
Jan-87
Mar-87
May-87
Jul-87
Sep-87
Nov-87
Jan-88
Mar-88
May-88
Jul-88
Sep-88
Nov-88
Jan-89
Mar-89
May-89
Jul-89
Sep-89
Nov-89
Jan-90
Mar-90
May-90
Jul-90
Sep-90
Date
Total VOCs

APPENDIX I

QUANTITIES OF CONTAMINATED GROUNDWATER

QUANTITIES OF CONTAMINATED MEDIA

The quantity of contaminated groundwater is based on the NYSDEC Class GA groundwater standards that are applicable to the UGA and Magothy Aquifer which are found below the site. The compounds found in the groundwater that exceed the Class GA groundwater standard are 1,1,1-TCA, TCE, PCE and their breakdown products. A total of 3 distinct plume areas are found within the NCIA study area including the eastern plume, central plume, and western plume. Each of these plumes currently exhibit off-site impacts. The total quantity of contaminated groundwater found off-site associated with the NCIA is approximately 612 million gallons. This includes approximately 42 million gallons associated with the eastern plume, 436 million gallons associated with the central plume, and 134 million gallons associated with the western plume.

ESTIMATED QUANTITY OF CONTAMINATED MEDIA

New Cassel Industrial Area Off-site Groundwater

Medium	Contaminated Volume by Depth (ft bgs) 0-64	65-99	100-124	125-200	Total Estimate of Contaminated Volume (gallons)
Groundwater Contaminant Plumes*					
Western Plume	2.81E+07	3.32E+07	1.73E+07	5.50E+07	1.33E+08
Central Plume	1.09E+07	1.03E+08	7.70E+07	2.46E+08	4.37E+08
Eastern Plume	6.05E+06	2.49E+07	1.10E+07	0	4.20E+07
				Total:	6.12E+08 612 million gallons

* - Assumes soil porosities of 20% for depths to 100 ft bgs and 15% for depths greater than 100 ft bgs.

* - Approximate maximum aerial extents of off-site plumes are as follows:

Western Plume: 1,878,000 sq ft

Central Plume: 2,920,000 sq ft

Eastern Plume: 490,000 sq ft

APPENDIX J

BioChlor MNA SOFTWARE AND MODEL RUN

Natural Attenuation Screening Protocol	Interpretation	Score	
The following is taken from the USEPA protocol (USEPA, 1998). The results of this scoring process have no regulatory significance.	Inadequate evidence for anaerobic biodegradation* of chlorinated organics	0 to 5	Score: 13
	Limited evidence for anaerobic biodegradation* of chlorinated organics	6 to 14	
	Adequate evidence for anaerobic biodegradation* of chlorinated organics	15 to 20	
	Strong evidence for anaerobic biodegradation* of chlorinated organics	>20	*Scroll to End of Table*

(0-7)±

*reductive dechlorination

Analysis	Concentration in Most Contam. Zone	Interpretation	Yes	No	Points Awarded	
Oxygen*	<0.5 mg/L	Tolerated, suppresses the reductive pathway at higher concentrations	○	●	0	
	>5mg/L	Not tolerated; however, VC may be oxidized aerobically	●	○	-3	
Nitrate*	<1 mg/L	At higher concentrations may compete with reductive pathway	○	●	0	
Iron II*	>1 mg/L	Reductive pathway possible; VC may be oxidized under Fe(III)-reducing conditions	●	○	3	
Sulfate*	<20 mg/L	At higher concentrations may compete with reductive pathway	○	●	0	
Sulfide*	>1 mg/L	Reductive pathway possible	○	○	0	(0-3)
Methane*	<0.5 mg/L	VC oxidizes	●	○	0	
	>0.5 mg/L	Ultimate reductive daughter product, VC Accumulates	○	●	0	
Oxidation Reduction Potential* (ORP)	<50 millivolts (mV)	Reductive pathway possible	○	●	0	
	<-100mV	Reductive pathway likely	○	●	0	
pH*	5 < pH < 9	Optimal range for reductive pathway	●	○	0	
	5 > pH >9	Outside optimal range for reductive pathway	○	●	0	
TOC	>20 mg/L	Carbon and energy source; drives dechlorination; can be natural or anthropogenic	●	○	2	
Temperature*	>20°C	At T >20°C biochemical process is accelerated	○	●	0	
Carbon Dioxide	>2x background	Ultimate oxidative daughter product	○	○	0	(0-1)
Alkalinity	>2x background	Results from interaction of carbon dioxide with aquifer minerals	○	●	0	
Chloride*	>2x background	Daughter product of organic chlorine	○	●	0	
Hydrogen	>1 nM	Reductive pathway possible, VC may accumulate	○	○	0	
	<1 nM	VC oxidized	○	○	0	(0-3)
Volatile Fatty Acids	>0.1 mg/L	Intermediates resulting from biodegradation of aromatic compounds; carbon and energy source	○	●	0	
BTEX*	>0.1 mg/L	Carbon and energy source; drives dechlorination	○	●	0	
PCE*		Material released	●	○	0	
TCE*		Material released	●	○	0	
		Daughter product of PCE ✓	●	○	2	
DCE*		Material released	○	●	0	
		Daughter product of TCE. If cis is greater than 80% of total DCE it is likely a daughter product of TCE ✓; 1,1-DCE can be a chem. reaction product of TCA	●	○	2	
VC*		Material released	○	●	0	
		Daughter product of DCE ✓	●	○	2	
1,1,1-Trichloroethane*		Material released	●	○	0	
DCA		Daughter product of TCA under reducing conditions	●	○	2	
Carbon Tetrachloride		Material released	○	●	0	
Chloroethane*		Daughter product of DCA or VC under reducing conditions	●	○	0	
Ethene/Ethane	>0.01 mg/L	Daughter product of VC/ethene	○	●	0	
	>0.1 mg/L	Daughter product of VC/ethene	○	●	3	
Chloroform		Material released	○	●	0	
		Daughter product of Carbon Tetrachloride	●	○	0	
Dichloromethane		Material released	○	●	0	
		Daughter product of Chloroform	○	●	0	

* required analysis.

✓ Points awarded only if it can be shown that the compound is a daughter product (i.e., not a constituent of the source NAPL).

SCORE Reset

R2-0001190

Maximum Concentrations of VOCs
New Cassel
Off-Site Groundwater
(for MNA analysis)

	< 100 ft			100 - 200 ft		
	Western	Central	Eastern	Western	Central	Eastern
Volatile Organic Compounds						
Methane	ND	6	ND	ND	1	ND
Ethylene	ND	9	ND	ND	0.7 j	ND
1,1-Dichloroethane	46	110	ND	14	880 d	ND
1,1-Dichloroethylene	26	260 d	ND	7	1700 d	ND
1,1,1-Trichloroethane	230	180 d	ND	59	820 d	ND
1,1,2-Trichloroethane	ND	1 j	ND	ND	8 j	ND
1,2-Dichloroethane	ND	ND	ND	ND	22	ND
1,2-Dichloroethylene (total)	ND	29	ND	17	94	ND
Chloroethane	ND	2 j	ND	ND	ND	ND
Chloroform	ND	6	ND	2 j	8 j	ND
Tetrachloroethylene	59	51	ND	32	1100 d	ND
Trichloroethylene	21	220 d	ND	13	1800 d	ND
Toluene	1 j	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	4 j	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	1 j	ND
Vinyl Chloride	ND	ND	ND	ND	6 j	ND
Xylenes (total)	ND	2 j b	ND	ND	3	ND

Western Plume: UGA

BIOCHLOR Natural Attenuation Decision Support System

Version 1.0

NYSDEC
NCIA SITE
Run Name

Data Input Instructions:

115 — 1. Enter value directly ...or
or — 2. Calculate by filling in gray
0.02 — cells. Press Enter, then (C)
(To restore formulas, hit "Restore Formulas" button)
Variable* — Data used directly in model.

Test if Biotransformation is Occurring — Natural Attenuation Screening Protocol

TYPE OF CHLORINATED SOLVENT: Ethenes (●) Ethanes (○)

1. ADVECTION

Seepage Velocity*	Vs	536.3	(ft/yr)
or			
Hydraulic Conductivity	K	7.1E-02	(cm/sec)
Hydraulic Gradient	i	0.00146	(ft/ft)
Effective Porosity	n	0.2	(-)

2. DISPERSION

Alpha x Calc. Method	1600	(ft)
(Alpha y) / (Alpha x)	0.75	(-)
(Alpha z) / (Alpha x)	3.E-02	(-)

Change Alpha x Calc. Method

3. ADSORPTION

Retardation Factor* — R

or

Soil Bulk Density, rho	1.7	(kg/L)
FractionOrganicCarbon, foc	1.5E-3	(-)
Partition Coefficient	Koc	

	Koc		R	
PCE	426	(L/kg)	6.4	(-)
TCE	130	(L/kg)	2.7	(-)
DCE	125	(L/kg)	2.6	(-)
VC	30	(L/kg)	1.4	(-)
ETH	302	(L/kg)	4.9	(-)

Common R (used in model)* = 2.7

4. BIOTRANSFORMATION

-1st Order Decay Coef*

Zone 1

		λ (1/yr)	half-life (yrs)	Yield*
PCE	TCE	0.635		0.79
TCE	DCE	0.475		0.74
DCE	VC	1.740		0.64
VC	ETH	1.360		0.45

Zone 2

		λ (1/yr)	half-life (yrs)
PCE	TCE	0.000	
TCE	DCE	0.000	
DCE	VC	0.000	
VC	ETH	0.000	
ETH	Ethane	0.000	

5. GENERAL

Simulation Time*	30	(yr)
Modeled Area Width*	1500	(ft)
Modeled Area Length*	2000	(ft)
Zone 1 Length*	2000	(ft)
Zone 2 Length*	0	(ft)

L, W

Zone 2= L - Zone 1

6. SOURCE DATA

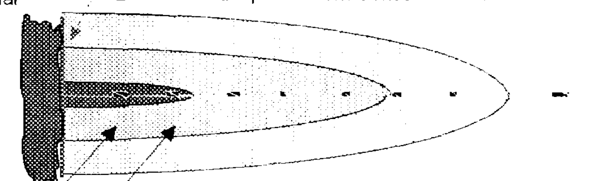
Source Options — TYPE: Single Planar

Source Thickness in Sat. Zone* 50 (ft)

Width* (ft) 900

Conc. (mg/L)*	C1
PCE	.059
TCE	.021
DCE	.026
VC	0
ETH	0

Vertical Plane Source: Determine Source Well Location and Input Solvent Concentrations



View of Plume Looking Down

Observed Centerline Conc. at Monitoring Wells

7. FIELD DATA FOR COMPARISON

PCE Conc. (mg/L)	1.1	.009	.15	.006	.01
TCE Conc. (mg/L)	1.8	.01	.098	.003	.041
DCE Conc. (mg/L)	1.7	.016	.017	.5	.006
VC Conc. (mg/L)	0.1				.006
ETH Conc. (mg/L)	0.0		.001		.001
Dist. from Source (ft)	0	600	1050	1350	1750

8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN CENTERLINE — RUN ARRAY — Help — Restore Formulas — RESET — SEE OUTPUT — Paste Example

West_UGA_Max conc_30 yr.xls — Lawler, Matusky & Skelly Engineers LLP

R2-0001193

Start Here ---▶ ◉ PCE
○ TCE
○ DCE
○ VC
○ ETH

DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

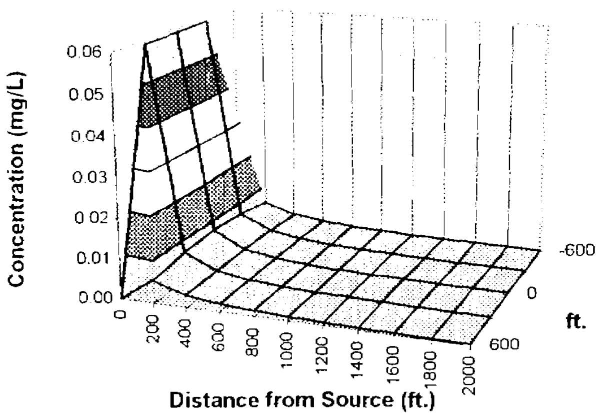
Transverse Distance (ft) / *Distance from Source (ft)*

	0	200	400	600	800	1000	1200	1400	1600	1800	2000
600	0.000	0.006	0.003	0.002	0.001	0.001	0.001	0.001	0.000	0.000	0.000
300	0.059	0.007	0.003	0.002	0.001	0.001	0.001	0.001	0.000	0.000	0.000
0	0.059	0.008	0.004	0.002	0.001	0.001	0.001	0.001	0.000	0.000	0.000
-300	0.059	0.007	0.003	0.002	0.001	0.001	0.001	0.001	0.000	0.000	0.000
-600	0.000	0.006	0.003	0.002	0.001	0.001	0.001	0.001	0.000	0.000	0.000
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: **30** yr   Target Level: **0.005** mg/L   Displayed Model: **Biotransformation**   Displayed Compound: **PCE**



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	9.5	*(Kg)*
- Plume Mass If Biotransformation/Production	7.8	*(Kg)*
Mass Removed	1.7	*(Kg)*

If "Can't Calc.", make model area longer

% Biotransformed = **+17.9%**

% Change in Mass Flux = **#VALUE!** (source to edge)

See acre-ft

Current Volume of Ground Water in Plume	35.90	*MGal*
Flow Rate of Water Through Source Area	0.099	*MGD*

Compare to Pump and Treat

Pumping Rate		*(gpm)*
# Pore Volumes Removed Per Yr	0.0	
# Pore Volumes to Clean-Up		
Clean-Up Time		*(yr)*

Plot All Data   Plot Data > Target   Mass HELP   To Centerline   Return to Input

West_UGA_Max conc_30 yr.xls

Lawler, Matusky & Skelly Engineers LLP

Start Here → ○ PCE
◉ TCE
○ DCE
○ VC
○ ETH

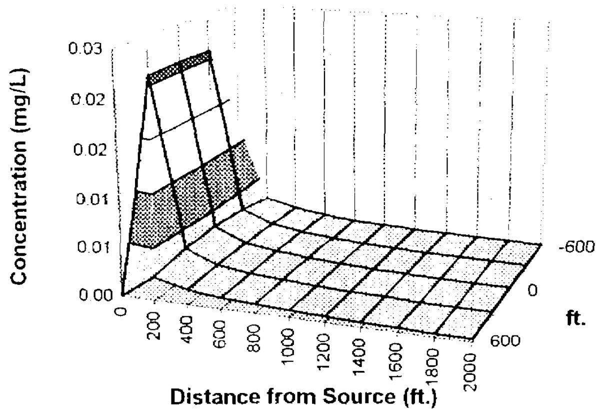
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft)	*Distance from Source (ft)* 0	200	400	600	800	1000	1200	1400	1600	1800	2000
600	0.000	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000
300	0.021	0.003	0.002	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000
0	0.021	0.003	0.002	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000
-300	0.021	0.003	0.002	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000
-600	0.000	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: 30 yr Target Level: 0.005 mg/L Displayed Model: Biotransformation Displayed Compound: TCE



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons — Plume Mass If No Degradation	3.4	(Kg)
- Plume Mass If Biotransformation/Production	3.6	(Kg)
Mass Removed	-0.3	(Kg)
% Biotransformed =	-7.8 %	
% Change in Mass Flux =	**#VALUE!**	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	13.46	MGal
Flow Rate of Water Through Source Area	0.099	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	0.0	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data | Plot Data > Target | Mass HELP | To Centerline | Return to Input

West_UGA_Max conc_30 yr.xls

Lawler, Matusky & Skelly Engineers LLP

R2-0001195

Start Here → ○ PCE
○ TCE
◉ DCE
○ VC
○ ETH

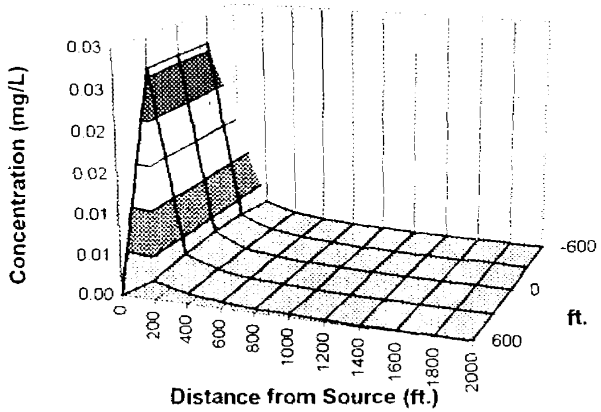
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft)	*Distance from Source (ft)* 0	200	400	600	800	1000	1200	1400	1600	1800	2000
600	0.000	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
300	0.026	0.003	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000
0	0.026	0.003	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000
-300	0.026	0.003	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000
-600	0.000	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: 30 yr Target Level: 0.070 mg/L Displayed Model: Biotransformation Displayed Compound: DCE



Plot All Data | Plot Data > Target

Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	4.2	(Kg)
- Plume Mass If Biotransformation/Production	3.2	(Kg)
Mass Removed	0.9	(Kg)

If "Can't Calc.", make model area longer

% Biotransformed = **+22.6%**

% Change in Mass Flux = **#VALUE!** (source to edge)

See acre ft

Current Volume of Ground Water in Plume	13.46	MGal
Flow Rate of Water Through Source Area	0.099	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	0.0	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Mass HELP | To Centerline | Return to Input

West_UGA_Max conc_30 yr xls

Lawler, Matusky & Skelly Engineers LLP

R2-0001196

Start Here → ○ PCE
○ TCE
○ DCE
◉ VC
○ ETH

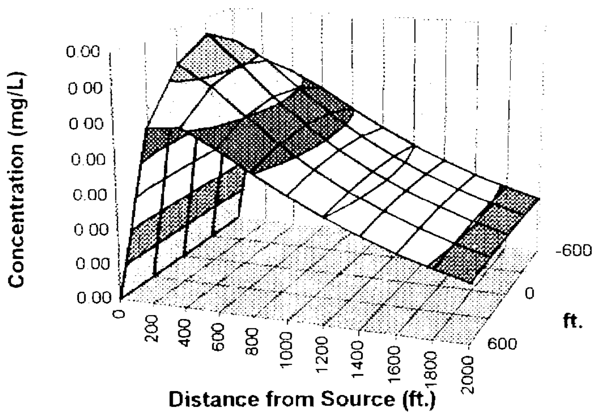
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Show No Degradation

Show Biotransformation

Transverse Distance (ft)	*Distance from Source (ft)* 0	200	400	600	800	1000	1200	1400	1600	1800	2000
600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
300	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-300	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Time: **30** yr   Target Level: **0.002** mg/L   Displayed Model: Biotransformation   Displayed Compound: VC



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	0.0	(Kg)
- Plume Mass If Biotransformation/Production	0.4	(Kg)
Mass Removed	-0.4	(Kg)

If "Can't Calc.", make model area longer

% Biotransformed =

% Change in Mass Flux = #VALUE! (source to edge)

See acre ft

Current Volume of Ground Water in Plume	0.00	MGal
Flow Rate of Water Through Source Area	0.099	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	#DIV/0!	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data   Plot Data > Target

Mass HELP   **To Centerline**   **Return to Input**

West_UGA_Max conc_30 yr.xls

Lawler, Matusky & Skelly Engineers LLP

R2-0001197

Start Here → ○ PCE
○ TCE
○ DCE
○ VC
◉ ETH

DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

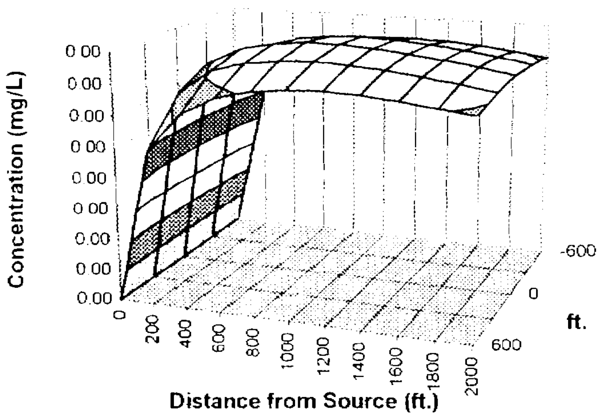
Transverse Distance (ft) / ***Distance from Source (ft)***

	0	200	400	600	800	1000	1200	1400	1600	1800	2000
600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
300	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-300	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: 30 yr   Target Level: mg/L   Displayed Model: Biotransformation   Displayed Compound: ETH



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	0.0	(Kg)
- Plume Mass If Biotransformation/Production	0.3	(Kg)
Mass Removed	-0.3	(Kg)
% Biotransformed =		
% Change in Mass Flux =	#VALUE!	(source to edge)

If "Can't Calc.", make model area longer

See acre ft

Current Volume of Ground Water in Plume	0.00	MGal
Flow Rate of Water Through Source Area	0.099	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	#DIV/0!	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data   Plot Data > Target   Mass HELP   To Centerline   Return to Input

West_UGA_Max conc_30 yr.xls

Lawler, Matusky & Skelly Engineers LLP

R2-0001198

Start Here → ○ PCE
○ TCE
○ DCE
◉ VC
○ ETH

DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) / *Distance from Source (ft)*	0	200	400	600	800	1000	1200	1400	1600	1800	2000
600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
300	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-300	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

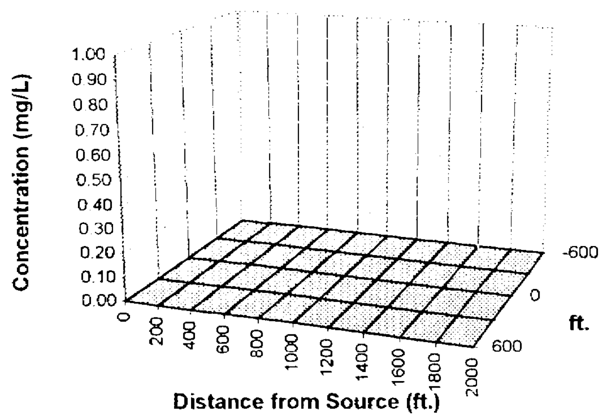
Show Biotransformation

Time: 30 yr

Target Level: **0.002** mg/L

Displayed Model: **No Degradation**

Displayed Compound: **VC**



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	0.0	*(Kg)*
- Plume Mass If Biotransformation/Production	0.4	*(Kg)*
Mass Removed	-0.4	*(Kg)*

If "Can't Calc.", make model area longer

% Biotransformed =

% Change in Mass Flux = #VALUE! (source to edge)

See acre-ft

Current Volume of Ground Water in Plume	0.00	*MGal*
Flow Rate of Water Through Source Area	0.099	*MGD*

Compare to Pump and Treat

Pumping Rate		*(gpm)*
# Pore Volumes Removed Per Yr.	#DIV/0!	
# Pore Volumes to Clean-Up		
Clean-Up Time		*(yr)*

Plot All Data Plot Data > Target

Mass HELP **To Centerline** **Return to Input**

West_UGA_Max conc_30 yr.xls

Lawler, Matusky & Skelly Engineers LLP

Start Here → ○ PCE
○ TCE
○ DCE
○ VC
◉ ETH

DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft)	*Distance from Source (ft)* 0	200	400	600	800	1000	1200	1400	1600	1800	2000
600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
300	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-300	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

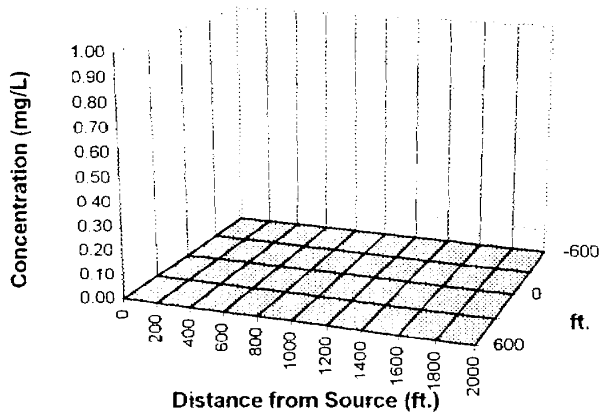
Show Biotransformation

Time: 30 yr

Target Level: mg/L

Displayed Model: No Degradation

Displayed Compound: ETH



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	0.0	(Kg)
- Plume Mass If Biotransformation/Production	0.3	(Kg)
Mass Removed	-0.3	(Kg)

If "Can't Calc.", make model area longer

% Biotransformed =

% Change in Mass Flux = #VALUE! (source to edge)

See acre-ft

Current Volume of Ground Water in Plume	0.00	MGal
Flow Rate of Water Through Source Area	0.099	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	#DIV/0!	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data | Plot Data > Target

Mass HELP | To Centerline | Return to Input

West_UGA_Max conc_30 yr.xls

Lawler, Matusky & Skelly Engineers LLP

R2-0001200

Western Plume: Magothy Aquifer

BIOCHLOR Natural Attenuation Decision Support System

Version 1.0

NYSDEC
NCIA SITE
Run Name

Data Input Instructions:

115 — 1. Enter value directly....or
or — 2. Calculate by filling in gray
0.02 — cells. Press Enter, then (C)
(To restore formulas, hit "Restore Formulas" button)
Variable* — Data used directly in model.

Test if Biotransformation is Occurring → Natural Attenuation Screening Protocol

TYPE OF CHLORINATED SOLVENT: Ethenes ◉ Ethanes ○

1. ADVECTION

Seepage Velocity*	Vs	177.2	(ft/yr)
or			
Hydraulic Conductivity	K	1.8E-02	(cm/sec)
Hydraulic Gradient	i	0.00146	(ft/ft)
Effective Porosity	n	0.15	(-)

2. DISPERSION

Alpha x Calc. Method	820	(ft)
(Alpha y) / (Alpha x)	1.02	(-)
(Alpha z) / (Alpha x)	1.E-01	(-)

Change Alpha x Calc. Method

3. ADSORPTION

Retardation Factor* R

or

Soil Bulk Density, rho	2	(kg/L)
FractionOrganicCarbon, foc	1.5E-3	(-)

Partition Coefficient	Koc			
PCE	426	(L/kg)	9.5	(-)
TCE	130	(L/kg)	3.6	(-)
DCE	125	(L/kg)	3.5	(-)
VC	30	(L/kg)	1.6	(-)
ETH	302	(L/kg)	7.0	(-)

Common R (used in model)* = 3.6

4. BIOTRANSFORMATION — **-1st Order Decay Coef***

Zone 1		λ (1/yr)	half-life (yrs)	Yield*
PCE	TCE	0.635		0.79
TCE	DCE	0.475		0.74
DCE	VC	1.740		0.64
VC	ETH	1.360		0.45

Zone 2		λ (1/yr)	half-life (yrs)
PCE	TCE	0.000	
TCE	DCE	0.000	
DCE	VC	0.000	
VC	ETH	0.000	
ETH	Ethane	0.000	

5. GENERAL

Simulation Time*	30	(yr)
Modeled Area Width*	1050	(ft)
Modeled Area Length*	1025	(ft)
Zone 1 Length*	1025	(ft)
Zone 2 Length*	0	(ft)

L W
Zone 2= L - Zone 1

6. SOURCE DATA

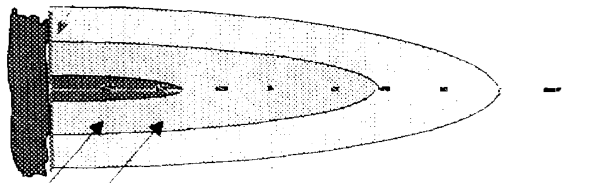
Source Options — TYPE: Single Planar

Vertical Plane Source: Determine Source Well Location and Input Solvent Concentrations

Source Thickness in Sat. Zone* 100 (ft)

Width* (ft) 625

Conc. (mg/L)*	C1
PCE	.032
TCE	.013
DCE	.007
VC	.0
ETH	.0



View of Plume Looking Down

Observed Centerline Conc. at Monitoring Wells

7. FIELD DATA FOR COMPARISON

PCE Conc. (mg/L)	1.1	.009	.15	.006	.01
TCE Conc. (mg/L)	1.8	.01	.098	.003	.041
DCE Conc. (mg/L)	1.7	.016	.017	.5	.006
VC Conc. (mg/L)	0.1				.006
ETH Conc. (mg/L)	0.0		.001		.001
Dist. from Source (ft)	0	600	1050	1350	1750

8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN CENTERLINE | RUN ARRAY | Help | Restore Formulas | RESET | SEE OUTPUT | Paste Example

Start Here → ◉ PCE
○ TCE
○ DCE
○ VC
○ ETH

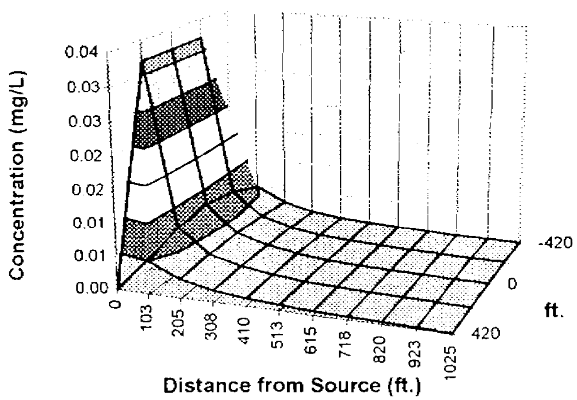
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft)	*Distance from Source (ft)* 0	103	205	308	410	513	615	718	820	923	1025
420	0.000	0.005	0.003	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000
210	0.032	0.007	0.003	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000
0	0.032	0.008	0.004	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000
-210	0.032	0.007	0.003	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000
-420	0.000	0.005	0.003	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: 30 yr | Target Level: 0.005 mg/L | Displayed Model: Biotransformation | Displayed Compound: PCE



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	5.6	(Kg)
- Plume Mass If Biotransformation/Production	4.2	(Kg)
Mass Removed	1.5	(Kg)

If "Can't Calc.", make model area longer

% Biotransformed = +26.0%

% Change in Mass Flux = #VALUE! (source to edge)

See acre ft

Current Volume of Ground Water in Plume	19.32	MGal
Flow Rate of Water Through Source Area	0.034	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr	0.0	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data | Plot Data > Target | Mass HELP | To Centerline | Return to Input

West_MA_Max conc_30 yr.xls

Lawler, Matusky & Skelly Engineers LLP

Start Here → ○ PCE
◉ TCE
○ DCE
○ VC
○ ETH

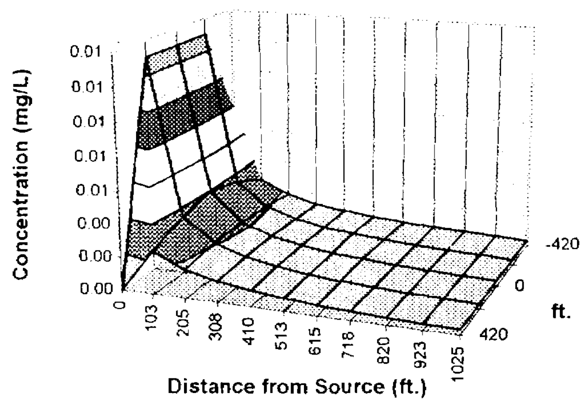
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft)	*Distance from Source (ft)* 0	103	205	308	410	513	615	718	820	923	1025
420	0.000	0.003	0.002	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000
210	0.013	0.004	0.002	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000
0	0.013	0.004	0.002	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000
-210	0.013	0.004	0.002	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000
-420	0.000	0.003	0.002	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: 30 yr   Target Level: 0.005 mg/L   Displayed Model: Biotransformation   Displayed Compound: TCE



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	2.3	(Kg)
- Plume Mass If Biotransformation/Production	2.4	(Kg)
Mass Removed	-0.1	(Kg)
% Biotransformed =	-6.2 %	
% Change in Mass Flux =	#VALUE!	(source to edge)

If "Can't Calc.", make model area longer

See acre ft

Current Volume of Ground Water in Plume	7.25	MGal
Flow Rate of Water Through Source Area	0.034	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	0.0	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data   Plot Data > Target   Mass HELP   To Centerline   Return to Input

West_MA_Max conc_30 yr.xls

Lawler, Matusky & Skelly Engineers LLP

R2-0001204

Start Here → ○ PCE
○ TCE
◉ DCE
○ VC
○ ETH

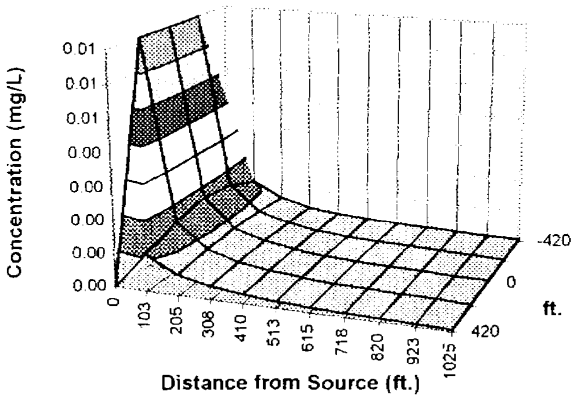
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft)	*Distance from Source (ft)* 0	103	205	308	410	513	615	718	820	923	1025
420	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
210	0.007	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.007	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-210	0.007	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-420	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: 30 yr   Target Level: 0.070 mg/L   Displayed Model: Biotransformation   Displayed Compound: DCE



Plot All Data   Plot Data > Target

Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	1.2	(Kg)
- Plume Mass If Biotransformation/Production	0.9	(Kg)
Mass Removed	0.3	(Kg)

If "Can't Calc.", make model area longer

% Biotransformed =	**+23.3%**	
% Change in Mass Flux =	**#VALUE!**	(source to edge)

See acre ft

Current Volume of Ground Water in Plume	7.25	*MGal*
Flow Rate of Water Through Source Area	0.034	*MGD*

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	0.0	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Mass HELP   To Centerline   Return to Input

West_MA_Max conc_30 yr.xls

Lawler, Matusky & Skelly Engineers LLP

R2-0001205

Start Here → ○ PCE ○ TCE ○ DCE ◉ VC ○ ETH

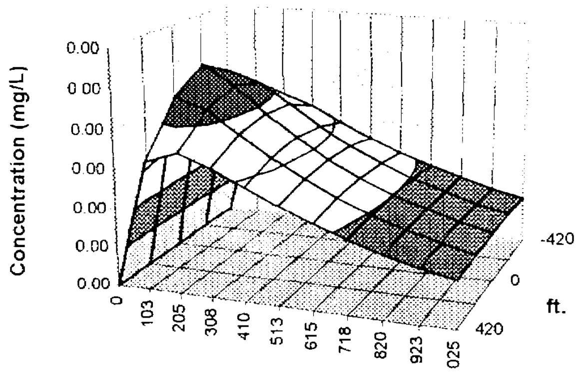
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft)	*Distance from Source (ft)* 0	103	205	308	410	513	615	718	820	923	1025
420	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-420	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: 30 yr   Target Level: 0.002 mg/L   Displayed Model: Biotransformation   Displayed Compound: VC



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons	Plume Mass If No Degradation	0.0	(Kg)
	- Plume Mass If Biotransformation/Production	0.2	(Kg)
	Mass Removed	-0.2	(Kg)
If "Can't Calc.", make model area longer	**% Biotransformed =**		
	% Change in Mass Flux =	**#VALUE!**	(source to edge)
See acre ft	Current Volume of Ground Water in Plume	0.00	*MGal*
	Flow Rate of Water Through Source Area	0.034	*MGD*
Compare to Pump and Treat	Pumping Rate		(gpm)
	# Pore Volumes Removed Per Yr.	#DIV/0!	
	# Pore Volumes to Clean-Up		
	Clean-Up Time		(yr)

Plot All Data   Plot Data > Target   Mass HELP   To Centerline   Return to Input

Start Here → ○ PCE
○ TCE
○ DCE
○ VC
◉ ETH

DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

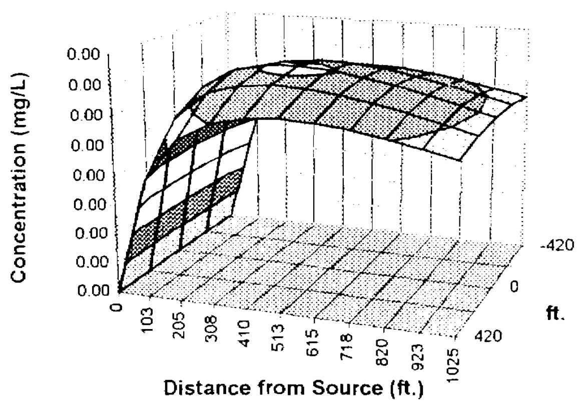
Transverse Distance (ft) — *Distance from Source (ft)*

	0	103	205	308	410	513	615	718	820	923	1025
420	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-420	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: 30 yr   Target Level: mg/L   Displayed Model: Biotransformation   Displayed Compound: ETH



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	0.0	(Kg)
- Plume Mass If Biotransformation/Production	0.2	(Kg)
Mass Removed	-0.2	(Kg)
% Biotransformed =		
% Change in Mass Flux =	#VALUE!	(source to edge)

If "Can't Calc.", make model area longer

See acre ft

Current Volume of Ground Water in Plume	0.00	MGal
Flow Rate of Water Through Source Area	0.034	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	#DIV/0!	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data   Plot Data > Target   Mass HELP   To Centerline   Return to Input

West_MA_Max conc_30 yr.xls   Lawler, Matusky & Skelly Engineers LLP

R2-0001207

Start Here → PCE TCE DCE VC ETH

DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

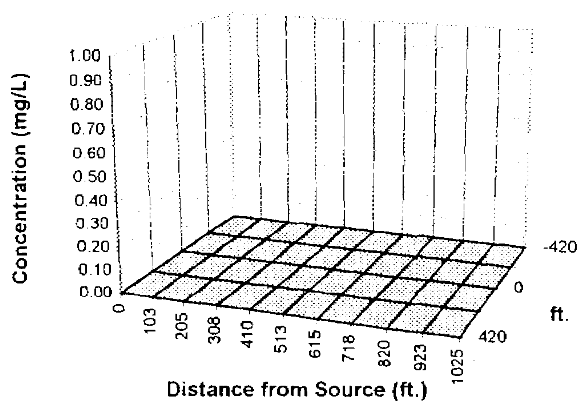
Transverse Distance (ft) — *Distance from Source (ft)*

	0	103	205	308	410	513	615	718	820	923	1025
420	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-420	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: 30 yr Target Level: 0.002 mg/L Displayed Model: No Degradation Displayed Compound: VC



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	0.0	(Kg)
- Plume Mass If Biotransformation/Production	0.2	(Kg)
Mass Removed	-0.2	(Kg)
% Biotransformed =		
% Change in Mass Flux =	**#VALUE!**	(source to edge)

If "Can't Calc.", make model area longer

See acre ft

Current Volume of Ground Water in Plume	0.00	MGal
Flow Rate of Water Through Source Area	0.034	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	#DIV/0!	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target

Mass HELP To Centerline Return to Input

West_MA_Max conc_30 yr.xls

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R2-0001208

Start Here → ○ PCE
○ TCE
○ DCE
○ VC
◉ ETH

DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft)	*Distance from Source (ft)*										
	0	103	205	308	410	513	615	718	820	923	1025
420	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-420	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

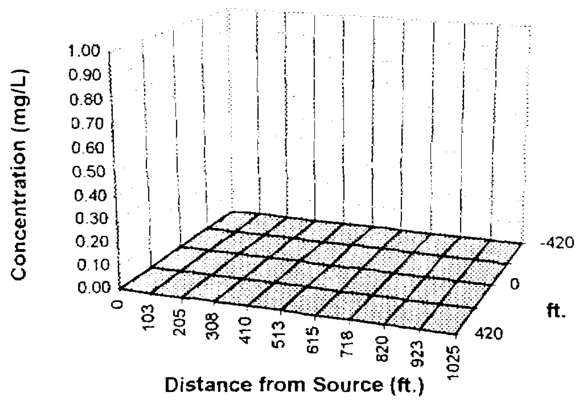
Show Biotransformation

Time: 30 yr

Target Level: mg/L

Displayed Model: No Degradation

Displayed Compound: ETH



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	0.0	*(Kg)*
- Plume Mass If Biotransformation/Production	0.2	*(Kg)*
Mass Removed	-0.2	*(Kg)*

If "Can't Calc.", make model area longer

% Biotransformed =

% Change in Mass Flux = **#VALUE!** (source to edge)

See acre ft

Current Volume of Ground Water in Plume	0.00	*MGal*
Flow Rate of Water Through Source Area	0.034	*MGD*

Compare to Pump and Treat

Pumping Rate		*(gpm)*
# Pore Volumes Removed Per Yr	#DIV/0!	
# Pore Volumes to Clean-Up		
Clean-Up Time		*(yr)*

Plot All Data | Plot Data > Target | Mass HELP | To Centerline | Return to Input

West_MA_Max conc_30 yr.xls

Lawler, Matusky & Skelly Engineers LLP

Central Plume: UGA

BIOCHLOR Natural Attenuation Decision Support System

Version 1.0

NYSDEC
NCIA SITE
Run Name

Data Input Instructions:

115 — 1. Enter value directly....or
or — 2. Calculate by filling in gray
0.02 — cells. Press Enter, then (C)
(To restore formulas, hit "Restore Formulas" button)
Variable* — Data used directly in model.

Test if Biotransformation is Occurring → Natural Attenuation Screening Protocol

TYPE OF CHLORINATED SOLVENT: Ethenes ◉ Ethanes ○

1. ADVECTION

Seepage Velocity*	Vs	536.3	(ft/yr)
or			
Hydraulic Conductivity	K	7.1E-02	(cm/sec)
Hydraulic Gradient	i	0.00146	(ft/ft)
Effective Porosity	n	0.2	(-)

2. DISPERSION

Alpha x Calc. Method	1300	(ft)
(Alpha y) / (Alpha x)	1.2	(-)
(Alpha z) / (Alpha x)	4.E-02	(-)

Change Alpha x Calc. Method

3. ADSORPTION

Retardation Factor* R

or

Soil Bulk Density, rho	1.7	(kg/L)
FractionOrganicCarbon, foc	1.5E-3	(-)

Partition Coefficient	Koc		R	
PCE	426	(L/kg)	6.4	(-)
TCE	130	(L/kg)	2.7	(-)
DCE	125	(L/kg)	2.6	(-)
VC	30	(L/kg)	1.4	(-)
ETH	302	(L/kg)	4.9	(-)

Common R (used in model)* = 2.7

4. BIOTRANSFORMATION — -1st Order Decay Coef*

Zone 1	λ (1/yr)	half-life (yrs)	Yield*
PCE → TCE	0.635		0.79
TCE → DCE	0.475		0.74
DCE → VC	1.740		0.64
VC → ETH	1.360		0.45

Zone 2	λ (1/yr)	half-life (yrs)
PCE → TCE	0.000	
TCE → DCE	0.000	
DCE → VC	0.000	
VC → ETH	0.000	
ETH → Ethane	0.000	

5. GENERAL

Simulation Time*	30	(yr)
Modeled Area Width*	1950	(ft)
Modeled Area Length*	1625	(ft)
Zone 1 Length*	1625	(ft)
Zone 2 Length*	0	(ft)

L W
Zone 2= L - Zone 1

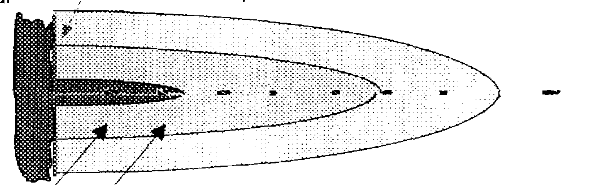
6. SOURCE DATA

Source Options — TYPE: Single Planar

Source Thickness in Sat. Zone* 50 (ft)

Width* (ft) 1170

Vertical Plane Source: Determine Source Well Location and Input Solvent Concentrations



View of Plume Looking Down

Observed Centerline Conc. at Monitoring Wells

Conc. (mg/L)*	C1
PCE	.051
TCE	.22
DCE	.26
VC	.0
ETH	.009

7. FIELD DATA FOR COMPARISON

PCE Conc. (mg/L)	1.1	.009	.15	.006	.01						
TCE Conc. (mg/L)	1.8	.01	.098	.003	.041						
DCE Conc. (mg/L)	1.7	.016	.017	.5	.006						
VC Conc. (mg/L)	0.1				.006						
ETH Conc. (mg/L)	0.0		.001		.001						
Dist. from Source (ft)	0	600	1050	1350	1750						

8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN CENTERLINE — RUN ARRAY — **Help** — Restore Formulas — RESET — SEE OUTPUT — Paste Example

Central_UGA_Max conc_30 yr.xls

Lawler, Matusky & Skelly Engineers LLP

R2-0001211

Start Here → ◉ PCE
○ TCE
○ DCE
○ VC
○ ETH

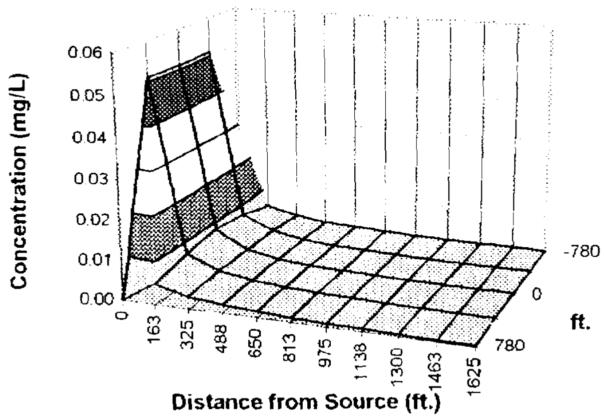
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft)	***Distance from Source (ft)*** 0	163	325	488	650	813	975	1138	1300	1463	1625
780	0.000	0.005	0.003	0.002	0.001	0.001	0.001	0.001	0.001	0.000	0.000
390	0.051	0.007	0.004	0.002	0.002	0.001	0.001	0.001	0.001	0.000	0.000
0	0.051	0.008	0.004	0.002	0.002	0.001	0.001	0.001	0.001	0.000	0.000
-390	0.051	0.007	0.004	0.002	0.002	0.001	0.001	0.001	0.001	0.000	0.000
-780	0.000	0.005	0.003	0.002	0.001	0.001	0.001	0.001	0.001	0.000	0.000
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: 30 yr   Target Level: 0.005 mg/L   Displayed Model: Biotransformation   Displayed Compound: PCE



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	9.7	(Kg)
- Plume Mass If Biotransformation/Production	7.9	(Kg)
Mass Removed	1.7	(Kg)
% Biotransformed =	+17.8%	
% Change in Mass Flux =	#VALUE!	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	37.92	MGal
Flow Rate of Water Through Source Area	0.129	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	0.0	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data   Plot Data > Target   Mass HELP   To Centerline   Return to Input

Central_UGA_Max conc_30 yr.xls

Lawler, Matusky & Skelly Engineers LLP

R2-0001212

Start Here → ○ PCE
◉ TCE
○ DCE
○ VC
○ ETH

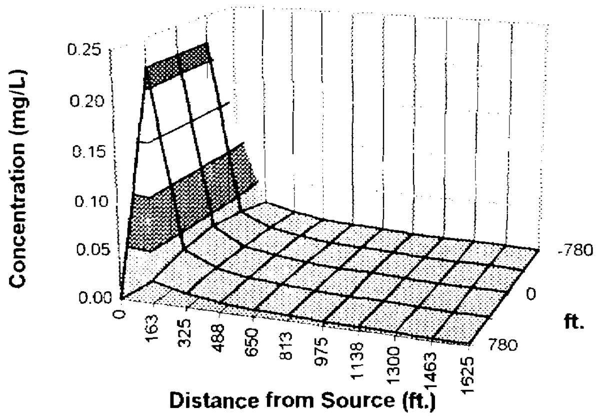
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) / *Distance from Source (ft)*	0	163	325	488	650	813	975	1138	1300	1463	1625
780	0.000	0.023	0.014	0.010	0.007	0.005	0.004	0.004	0.003	0.002	0.002
390	0.220	0.033	0.017	0.011	0.008	0.006	0.005	0.004	0.003	0.003	0.002
0	0.220	0.037	0.018	0.012	0.008	0.006	0.005	0.004	0.003	0.003	0.002
-390	0.220	0.033	0.017	0.011	0.008	0.006	0.005	0.004	0.003	0.003	0.002
-780	0.000	0.023	0.014	0.010	0.007	0.005	0.004	0.004	0.003	0.002	0.002
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: 30 yr Target Level: 0.005 mg/L Displayed Model: Biotransformation Displayed Compound: TCE



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	41.7	*(Kg)*
- Plume Mass If Biotransformation/Production	36.2	*(Kg)*
Mass Removed	5.5	*(Kg)*

If "Can't Calc.", make model area longer

% Biotransformed = +13.2%

% Change in Mass Flux = #VALUE! (source to edge)

See acre-ft

Current Volume of Ground Water in Plume	132.73	*MGal*
Flow Rate of Water Through Source Area	0.129	*MGD*

Compare to Pump and Treat

Pumping Rate		*(gpm)*
# Pore Volumes Removed Per Yr.	0.0	
# Pore Volumes to Clean-Up		
Clean-Up Time		*(yr)*

Mass HELP To Centerline Return to Input

Plot All Data Plot Data > Target

Central_UGA_Max conc_30 yr.xls

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R2-0001213

Start Here → ○ PCE
○ TCE
◉ DCE
○ VC
○ ETH

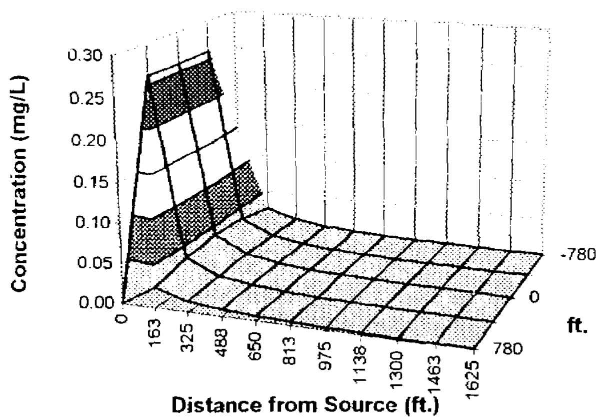
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft)	*Distance from Source (ft)* 0	163	325	488	650	813	975	1138	1300	1463	1625
780	0.000	0.024	0.014	0.009	0.006	0.004	0.003	0.002	0.002	0.001	0.001
390	0.260	0.035	0.017	0.010	0.006	0.004	0.003	0.002	0.002	0.001	0.001
0	0.260	0.040	0.018	0.010	0.007	0.005	0.003	0.002	0.002	0.001	0.001
-390	0.260	0.035	0.017	0.010	0.006	0.004	0.003	0.002	0.002	0.001	0.001
-780	0.000	0.024	0.014	0.009	0.006	0.004	0.003	0.002	0.002	0.001	0.001
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: 30 yr　Target Level: 0.070 mg/L　Displayed Model: Biotransformation　Displayed Compound: DCE



Plot All Data　Plot Data > Target

Central_UGA_Max conc_30 yr.xls

Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	49.2	(Kg)
- Plume Mass If Biotransformation/Production	36.9	(Kg)
Mass Removed	12.3	(Kg)

If "Can't Calc.", make model area longer

% Biotransformed = **+25.0%**

% Change in Mass Flux = **#VALUE!** (source to edge)

See acre-ft

Current Volume of Ground Water in Plume	109.03	MGal
Flow Rate of Water Through Source Area	0.129	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	0.0	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Mass HELP　To Centerline　Return to Input

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R2-0001214

Start Here → ○ PCE
○ TCE
○ DCE
◉ VC
○ ETH

DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

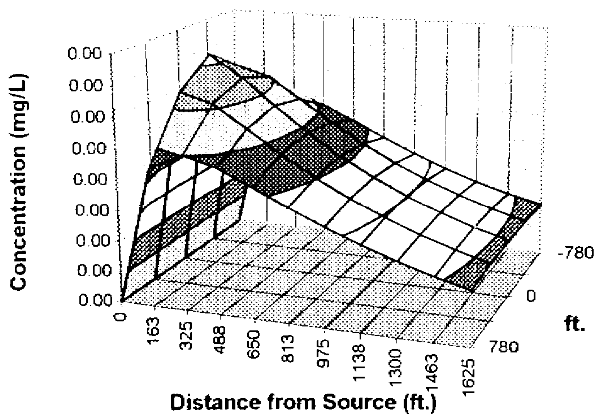
Transverse Distance (ft) / *Distance from Source (ft)*

	0	163	325	488	650	813	975	1138	1300	1463	1625
780	0.000	0.002	0.003	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001
390	0.000	0.003	0.003	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.001
0	0.000	0.004	0.003	0.003	0.002	0.002	0.002	0.002	0.001	0.001	0.001
-390	0.000	0.003	0.003	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.001
-780	0.000	0.002	0.003	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: **30** yr   Target Level: **0.002** mg/L   Displayed Model: **Biotransformation**   Displayed Compound: **VC**



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	0.0	(Kg)
- Plume Mass If Biotransformation/Production	4.5	(Kg)
Mass Removed	-4.5	(Kg)

If "Can't Calc.", make model area longer

% Biotransformed =

% Change in Mass Flux = **#VALUE!** (source to edge)

See acre-ft

Current Volume of Ground Water in Plume	0.00	MGal
Flow Rate of Water Through Source Area	0.129	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	#DIV/0!	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data   Plot Data > Target

Mass HELP   To Centerline   Return to Input

Central_UGA_Max conc_30 yr.xls

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R2-0001215

Start Here → ○ PCE
○ TCE
○ DCE
○ VC
◉ ETH

DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

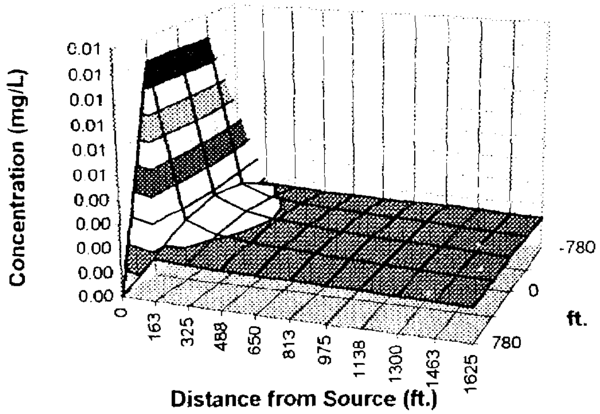
Transverse Distance (ft) / *Distance from Source (ft)*

	0	163	325	488	650	813	975	1138	1300	1463	1625
780	0.000	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001
390	0.009	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001
0	0.009	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001
-390	0.009	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001
-780	0.000	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: 30 yr   Target Level: [ ] mg/L   Displayed Model: Biotransformation   Displayed Compound: ETH



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons — Plume Mass If No Degradation	1.7	(Kg)
- Plume Mass If Biotransformation/Production	4.7	(Kg)
Mass Removed	-3.0	(Kg)
If "Can't Calc.", make model area longer — **% Biotransformed =**	-175.8 %	
% Change in Mass Flux =	**#VALUE!**	(source to edge)
See acre-ft — Current Volume of Ground Water in Plume	14.22	MGal
Flow Rate of Water Through Source Area	0.129	MGD
Compare to Pump and Treat — Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	0.0	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data   Plot Data > Target

Mass HELP   To Centerline   Return to Input

Central_UGA_Max conc_30 yr.xls

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R2-0001216

Start Here → ○ PCE
○ TCE
○ DCE
◉ VC
○ ETH

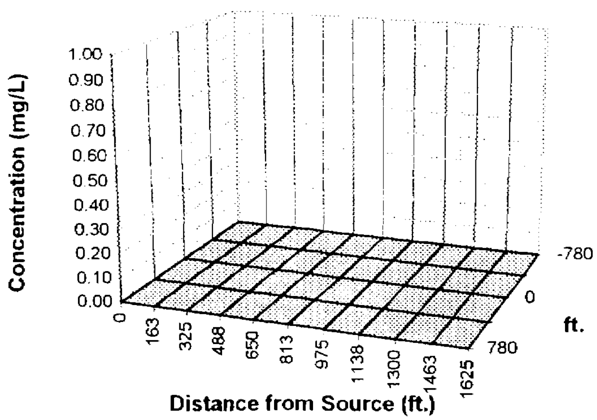
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft)	*Distance from Source (ft)* 0	163	325	488	650	813	975	1138	1300	1463	1625
780	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
390	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-390	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-780	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: **30** yr   Target Level: **0.002** mg/L   Displayed Model: **No Degradation**   Displayed Compound **VC**



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	0.0	*(Kg)*
- Plume Mass If Biotransformation/Production	4.5	*(Kg)*
Mass Removed	-4.5	*(Kg)*

If "Can't Calc.", make model area longer.

% Biotransformed =

% Change in Mass Flux = #VALUE! (source to edge)

See acre ft

Current Volume of Ground Water in Plume	0.00	*MGal*
Flow Rate of Water Through Source Area	0.129	*MGD*

Compare to Pump and Treat

Pumping Rate		*(gpm)*
# Pore Volumes Removed Per Yr.	#DIV/0!	
# Pore Volumes to Clean-Up		
Clean-Up Time		*(yr)*

Plot All Data   Plot Data > Target   Mass HELP   To Centerline   Return to Input

Central_UGA_Max conc_30 yr.xls

Lawler, Matusky & Skelly Engineers LLP

Start Here → ○ PCE
○ TCE
○ DCE
○ VC
◉ ETH

DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

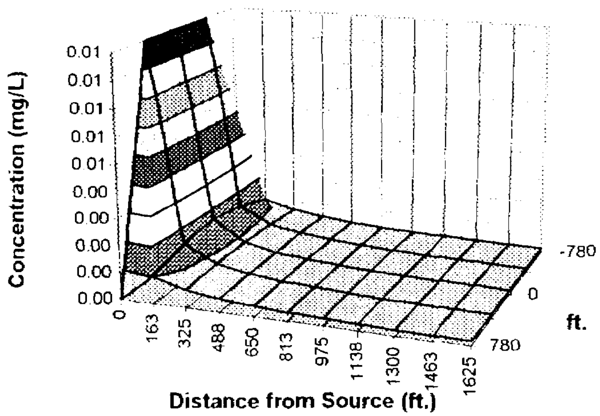
Transverse Distance (ft) / *Distance from Source (ft)*

	0	163	325	488	650	813	975	1138	1300	1463	1625
780	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
390	0.009	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.009	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-390	0.009	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-780	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: 30 yr   Target Level: ____ mg/L   Displayed Model: No Degradation   Displayed Compound: ETH



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons	Plume Mass If No Degradation	1.7	(Kg)
	- Plume Mass If Biotransformation/Production	4.7	(Kg)
	Mass Removed	-3.0	(Kg)
If "Can't Calc." make model area longer	**% Biotransformed =**	-175.8 %	
	% Change in Mass Flux =	**#VALUE!**	(source to edge)
See acre-ft	Current Volume of Ground Water in Plume	14.22	MGal
	Flow Rate of Water Through Source Area	0.129	MGD
Compare to Pump and Treat	Pumping Rate		(gpm)
	# Pore Volumes Removed Per Yr.	0.0	
	# Pore Volumes to Clean-Up		
	Clean-Up Time		(yr)

Plot All Data   Plot Data > Target   Mass HELP   To Centerline   Return to Input

Central_UGA_Max conc_30 yr.xls

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R2-0001218

Central Plume: Magothy Aquifer

BIOCHLOR Natural Attenuation Decision Support System

Version 1.0

NYSDEC
NCIA SITE
Run Name

Data Input Instructions:

115 — 1. Enter value directly....or
or — 2. Calculate by filling in gray
0.02 — cells. Press Enter, then (C)
(To restore formulas, hit "Restore Formulas" button)
Variable* — Data used directly in model.

Test if Biotransformation is Occurring → Natural Attenuation Screening Protocol

TYPE OF CHLORINATED SOLVENT: Ethenes ● Ethanes ○

1. ADVECTION

Seepage Velocity*	Vs	177.2	(ft/yr)
or			
Hydraulic Conductivity	K	1.8E-02	(cm/sec)
Hydraulic Gradient	i	0.00146	(ft/ft)
Effective Porosity	n	0.15	(-)

2. DISPERSION

Alpha x Calc. Method	820	(ft)
(Alpha y) / (Alpha x)	1.02	(-)
(Alpha z) / (Alpha x)	1.E-01	(-)

Change Alpha x Calc. Method

3. ADSORPTION

Retardation Factor* R

or

Soil Bulk Density, rho	2	(kg/L)
FractionOrganicCarbon, foc	1.5E-3	(-)

Partition Coefficient

	Koc		R	
PCE	426	(L/kg)	9.5	(-)
TCE	130	(L/kg)	3.6	(-)
DCE	125	(L/kg)	3.5	(-)
VC	30	(L/kg)	1.6	(-)
ETH	302	(L/kg)	7.0	(-)

Common R (used in model)* = 3.6

4. BIOTRANSFORMATION — **-1st Order Decay Coef***

Zone 1

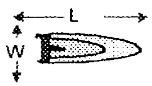
		λ (1/yr)	half-life (yrs)	Yield*
PCE	TCE	0.635		0.79
TCE	DCE	0.475		0.74
DCE	VC	1.740		0.64
VC	ETH	1.360		0.45

Zone 2

		λ (1/yr)	half-life (yrs)
PCE	TCE	0.000	
TCE	DCE	0.000	
DCE	VC	0.000	
VC	ETH	0.000	
ETH	Ethane	0.000	

5. GENERAL

Simulation Time*	30	(yr)
Modeled Area Width*	1050	(ft)
Modeled Area Length*	1025	(ft)
Zone 1 Length*	1025	(ft)
Zone 2 Length*	0	(ft)



Zone 2= L - Zone 1

6. SOURCE DATA

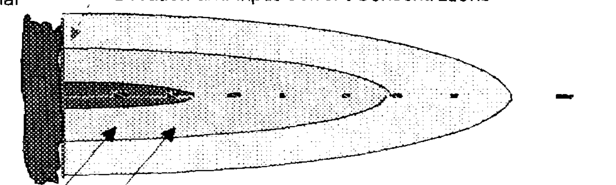
Source Options — TYPE: Single Planar

Source Thickness in Sat. Zone* 100 (ft)

Width* (ft) 625

Conc. (mg/L)*	C1
PCE	1.1
TCE	1.8
DCE	1.7
VC	.006
ETH	.001

Vertical Plane Source: Determine Source Well Location and Input Solvent Concentrations



View of Plume Looking Down

Observed Centerline Conc. at Monitoring Wells

7. FIELD DATA FOR COMPARISON

PCE Conc. (mg/L)	1.1	.009	.15	.006	.01						
TCE Conc. (mg/L)	1.8	.01	.098	.003	.041						
DCE Conc. (mg/L)	1.7	.016	.017	5	.006						
VC Conc. (mg/L)	0.1				.006						
ETH Conc. (mg/L)	0.0		.001		.001						
Dist. from Source (ft)	0	600	1050	1350	1750						

8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN CENTERLINE — RUN ARRAY — *Help* — Restore Formulas — RESET — SEE OUTPUT — Paste Example

Central_MA_Max conc_30 yr.xls

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R2-0001220

Start Here → ◉ PCE
○ TCE
○ DCE
○ VC
○ ETH

DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

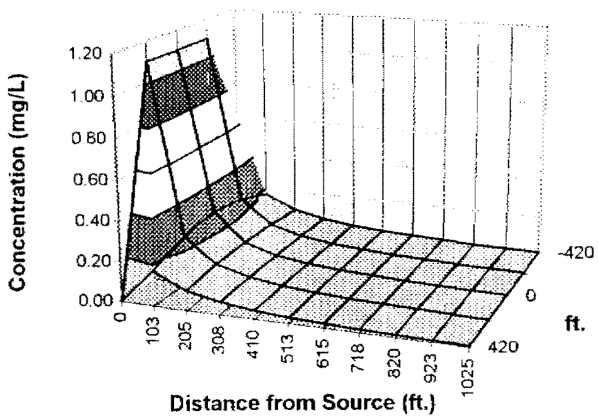
Transverse Distance (ft) / *Distance from Source (ft)*

	0	103	205	308	410	513	615	718	820	923	1025
420	0.000	0.174	0.098	0.062	0.041	0.029	0.021	0.016	0.012	0.009	0.007
210	1.100	0.240	0.117	0.069	0.045	0.031	0.022	0.017	0.012	0.009	0.007
0	1.100	0.267	0.124	0.072	0.047	0.032	0.023	0.017	0.013	0.010	0.007
-210	1.100	0.240	0.117	0.069	0.045	0.031	0.022	0.017	0.012	0.009	0.007
-420	0.000	0.174	0.098	0.062	0.041	0.029	0.021	0.016	0.012	0.009	0.007
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: **30** yr   Target Level: **0.005** mg/L   Displayed Model: **Biotransformation**   Displayed Compound **PCE**



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons — Plume Mass If No Degradation	192.8	*(Kg)*
- Plume Mass If Biotransformation/Production	142.8	*(Kg)*
Mass Removed	50.1	*(Kg)*
% Biotransformed =	**+26.0%**	
% Change in Mass Flux =	**#VALUE!**	(source to edge)
Current Volume of Ground Water in Plume	Can't Calc.	*MGal*
Flow Rate of Water Through Source Area	0.034	*MGD*
Compare to Pump and Treat — Pumping Rate		*(gpm)*
# Pore Volumes Removed Per Yr.		
# Pore Volumes to Clean-Up		
Clean-Up Time		*(yr)*

If "Can't Calc.", make model area longer

See acre-ft

Plot All Data   Plot Data > Target

Mass HELP   To Centerline   Return to Input

Central_MA_Max conc_30 yr.xls

Lawler, Matusky & Skelly Engineers LLP

R2-0001221

Start Here → ○ PCE ◉ TCE ○ DCE ○ VC ○ ETH

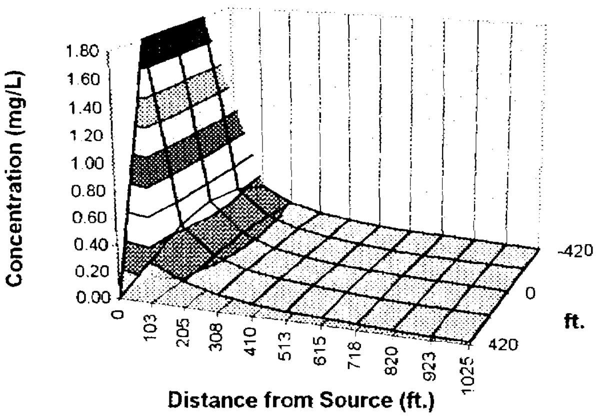
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft)	*Distance from Source (ft)* 0	103	205	308	410	513	615	718	820	923	1025
420	0.000	0.309	0.187	0.126	0.091	0.068	0.053	0.042	0.033	0.027	0.022
210	1.800	0.425	0.223	0.142	0.100	0.074	0.056	0.044	0.035	0.028	0.023
0	1.800	0.473	0.236	0.148	0.103	0.075	0.057	0.045	0.035	0.028	0.023
-210	1.800	0.425	0.223	0.142	0.100	0.074	0.056	0.044	0.035	0.028	0.023
-420	0.000	0.309	0.187	0.126	0.091	0.068	0.053	0.042	0.033	0.027	0.022
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: **30** yr   Target Level: **0.005** mg/L   Displayed Model: Biotransformation   Displayed Compound: TCE



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	315.6	(Kg)
- Plume Mass If Biotransformation/Production	267.6	(Kg)
Mass Removed	48.0	(Kg)
% Biotransformed =	**+15.2%**	
% Change in Mass Flux =	**#VALUE!**	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	Can't Calc.	MGal
Flow Rate of Water Through Source Area	0.034	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.		
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data   Plot Data > Target   Mass HELP   To Centerline   Return to Input

Central_MA_Max conc_30 yr.xls

Lawler, Matusky & Skelly Engineers LLP

R2-0001222

Start Here → ○ PCE
○ TCE
◉ DCE
○ VC
○ ETH

DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

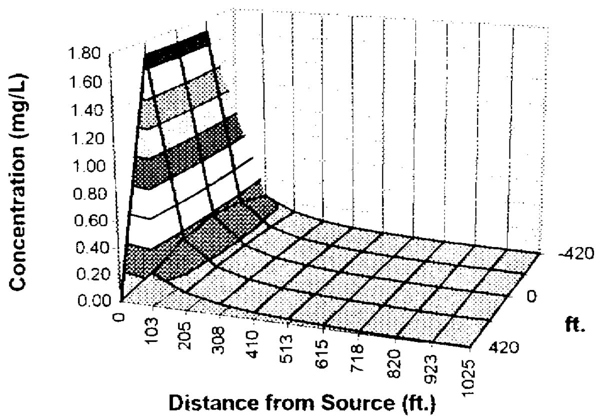
Transverse Distance (ft) / *Distance from Source (ft)*

	0	103	205	308	410	513	615	718	820	923	1025
420	0.000	0.249	0.130	0.077	0.049	0.033	0.023	0.017	0.013	0.010	0.007
210	1.700	0.343	0.155	0.087	0.054	0.036	0.025	0.018	0.013	0.010	0.008
0	1.700	0.381	0.164	0.090	0.056	0.037	0.025	0.018	0.013	0.010	0.008
-210	1.700	0.343	0.155	0.087	0.054	0.036	0.025	0.018	0.013	0.010	0.008
-420	0.000	0.249	0.130	0.077	0.049	0.033	0.023	0.017	0.013	0.010	0.007
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: **30** yr Target Level: **0.070** mg/L Displayed Model: **Biotransformation** Displayed Compound: **DCE**



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons	Plume Mass If No Degradation	298.0	(Kg)
	- Plume Mass If Biotransformation/Production	199.4	(Kg)
	Mass Removed	98.7	(Kg)
If "Can't Calc.", make model area longer	**% Biotransformed =**	**+33.1%**	
	% Change in Mass Flux =	**#VALUE!**	(source to edge)
See acre-ft	Current Volume of Ground Water in Plume	Can't Calc.	MGal
	Flow Rate of Water Through Source Area	0.034	MGD
Compare to Pump and Treat	Pumping Rate		(gpm)
	# Pore Volumes Removed Per Yr.		
	# Pore Volumes to Clean-Up		
	Clean-Up Time		(yr)

Plot All Data Plot Data > Target

Mass HELP **To Centerline** **Return to Input**

Central_MA_Max conc_30 yr.xls

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R2-0001223

Start Here → ○ PCE
○ TCE
○ DCE
◉ VC
○ ETH

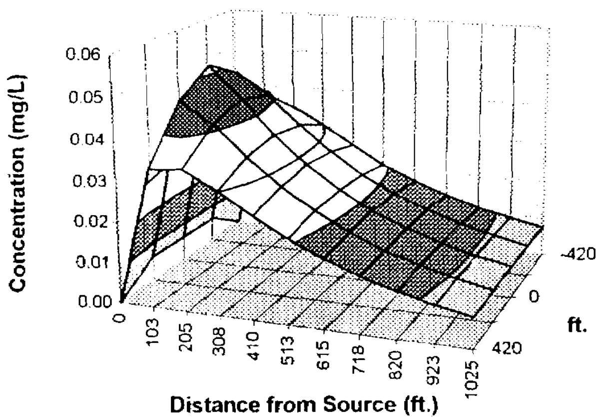
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft)	*Distance from Source (ft)*										
	0	103	205	308	410	513	615	718	820	923	1025
420	0.000	0.034	0.035	0.030	0.025	0.021	0.017	0.014	0.011	0.009	0.007
210	0.006	0.047	0.041	0.034	0.028	0.022	0.018	0.014	0.012	0.010	0.008
0	0.006	0.052	0.044	0.035	0.028	0.023	0.018	0.015	0.012	0.010	0.008
-210	0.006	0.047	0.041	0.034	0.028	0.022	0.018	0.014	0.012	0.010	0.008
-420	0.000	0.034	0.035	0.030	0.025	0.021	0.017	0.014	0.011	0.009	0.007
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: **30** yr   Target Level: **0.002** mg/L   Displayed Model: **Biotransformation**   Displayed Compound: **VC**



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	1.1	(Kg)
- Plume Mass If Biotransformation/Production	37.0	(Kg)
Mass Removed	-36.0	(Kg)
% Biotransformed =	**-3419.6 %**	
% Change in Mass Flux =	**#VALUE!**	(source to edge)

If "Can't Calc." make model area longer

See acre-ft

Current Volume of Ground Water in Plume	Can't Calc.	MGal
Flow Rate of Water Through Source Area	0.034	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.		
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data   Plot Data > Target   Mass HELP   To Centerline   Return to Input

Central_MA_Max conc_30 yr.xls

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R2-0001224

Start Here → ○ PCE
○ TCE
○ DCE
○ VC
◉ ETH

DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

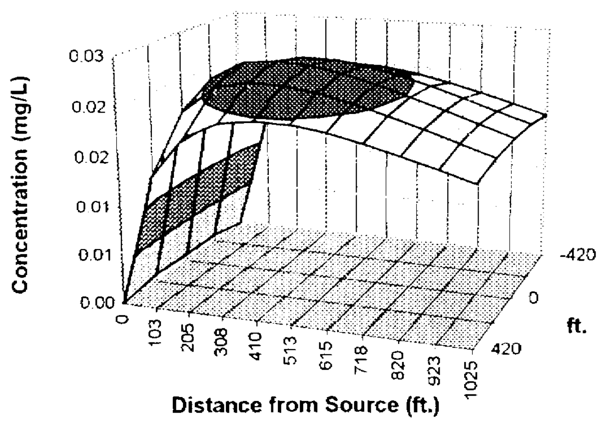
Transverse Distance (ft) / *Distance from Source (ft)*

	0	103	205	308	410	513	615	718	820	923	1025
420	0.000	0.013	0.018	0.019	0.020	0.020	0.019	0.019	0.018	0.017	0.016
210	0.001	0.018	0.021	0.022	0.022	0.021	0.020	0.020	0.019	0.017	0.016
0	0.001	0.020	0.022	0.023	0.022	0.022	0.021	0.020	0.019	0.018	0.017
-210	0.001	0.018	0.021	0.022	0.022	0.021	0.020	0.020	0.019	0.017	0.016
-420	0.000	0.013	0.018	0.019	0.020	0.020	0.019	0.019	0.018	0.017	0.016
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: **30** yr   Target Level: mg/L   Displayed Model: **Biotransformation**   Displayed Compound **ETH**



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons — Plume Mass If No Degradation	0.1	(Kg)
- Plume Mass If Biotransformation/Production	31.3	(Kg)
Mass Removed	-31.2	(Kg)
% Biotransformed =	**-25435.3 %**	
% Change in Mass Flux =	**#VALUE!**	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	Can't Calc.	MGal
Flow Rate of Water Through Source Area	0.034	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.		
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data   Plot Data > Target   Mass HELP   To Centerline   Return to Input

Central_MA_Max conc_30 yr.xls

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R2-0001225

Start Here → ○ PCE
○ TCE
○ DCE
◉ VC
○ ETH

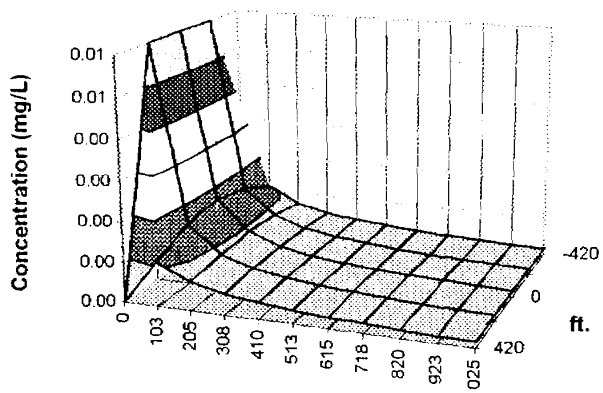
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft)	*Distance from Source (ft)* 0	103	205	308	410	513	615	718	820	923	1025
420	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
210	0.006	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.006	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-210	0.006	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-420	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: **30** yr   Target Level: **0.002** mg/L   Displayed Model: **No Degradation**   Displayed Compound: **VC**



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	1.1	(Kg)
- Plume Mass If Biotransformation/Production	37.0	(Kg)
Mass Removed	-36.0	(Kg)

If "Can't Calc.", make model area longer

% Biotransformed = **-3419.6 %**

% Change in Mass Flux = **#VALUE!** (source to edge)

See acre-ft

Current Volume of Ground Water in Plume	7.25	MGal
Flow Rate of Water Through Source Area	0.034	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	0.0	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data   Plot Data > Target

Mass HELP   To Centerline   Return to Input

Central_MA_Max conc_30 yr.xls

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R2-0001226

Start Here → ○ PCE
○ TCE
○ DCE
○ VC
◉ ETH

DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

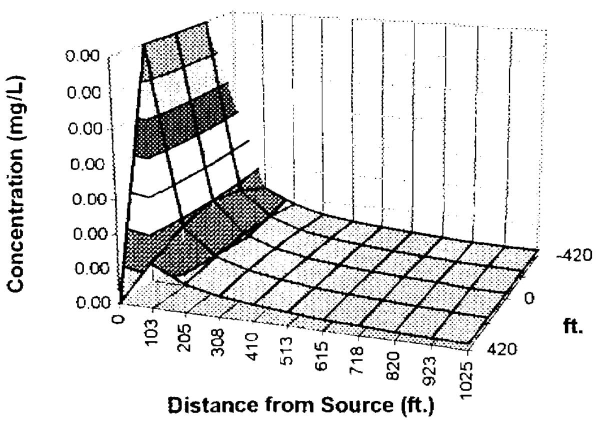
Transverse Distance (ft) — *Distance from Source (ft)*

	0	103	205	308	410	513	615	718	820	923	1025
420	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
210	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-210	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-420	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: **30** yr   Target Level: mg/L   Displayed Model: **No Degradation**   Displayed Compound **ETH**



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	0.1	*(Kg)*
- Plume Mass If Biotransformation/Production	31.3	*(Kg)*
Mass Removed	-31.2	*(Kg)*
% Biotransformed =	**-25435.3 %**	
% Change in Mass Flux =	**#VALUE!**	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	0.00	*MGal*
Flow Rate of Water Through Source Area	0.034	*MGD*

Compare to Pump and Treat

Pumping Rate		*(gpm)*
# Pore Volumes Removed Per Yr.	#DIV/0!	
# Pore Volumes to Clean-Up		
Clean-Up Time		*(yr)*

Plot All Data   Plot Data > Target   Mass HELP   To Centerline   Return to Input

Central_MA_Max conc_30 yr.xls

Lawler, Matusky & Skelly Engineers LLP

R2-0001227

Eastern Plume: UGA

BIOCHLOR Natural Attenuation Decision Support System

Version 1.0

NYSDEC
NCIA SITE

Run Name

Data Input Instructions:

115 ← 1. Enter value directly....or
or 2. Calculate by filling in gray
0.02 cells. Press Enter, then (C)
(To restore formulas, hit "Restore Formulas" button)
Variable* ← Data used directly in model.

Test if Biotransformation is Occurring → Natural Attenuation Screening Protocol

TYPE OF CHLORINATED SOLVENT: Ethenes ● Ethanes ○

1. ADVECTION

Seepage Velocity*	Vs	536.3	(ft/yr)
or			
Hydraulic Conductivity	K	7.1E-02	(cm/sec)
Hydraulic Gradient	i	0.00146	(ft/ft)
Effective Porosity	n	0.2	(-)

2. DISPERSION

Alpha x Calc. Method	650	(ft)
(Alpha y) / (Alpha x)	1.23	(-)
(Alpha z) / (Alpha x)	8.E-02	(-)

Change Alpha x Calc. Method

3. ADSORPTION

Retardation Factor* R

or

Soil Bulk Density, rho	1.7	(kg/L)		
FractionOrganicCarbon, foc	1.5E-3	(-)		
Partition Coefficient	Koc			
PCE	426	(L/kg)	6.4	(-)
TCE	130	(L/kg)	2.7	(-)
DCE	125	(L/kg)	2.6	(-)
VC	30	(L/kg)	1.4	(-)
ETH	302	(L/kg)	4.9	(-)

Common R (used in model)* = 2.7

4. BIOTRANSFORMATION

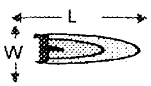
-1st Order Decay Coef*

Zone 1	λ (1/yr)	half-life (yrs)	Yield*
PCE → TCE	0.635		0.79
TCE → DCE	0.475		0.74
DCE → VC	1.740		0.64
VC → ETH	1.360		0.45

Zone 2	λ (1/yr)	half-life (yrs)
PCE → TCE	0.000	
TCE → DCE	0.000	
DCE → VC	0.000	
VC → ETH	0.000	
ETH → Ethane	0.000	

5. GENERAL

Simulation Time*	30	(yr)
Modeled Area Width*	1000	(ft)
Modeled Area Length*	900	(ft)
Zone 1 Length*	900	(ft)
Zone 2 Length*	0	(ft)



Zone 2= L - Zone 1

6. SOURCE DATA

Source Options

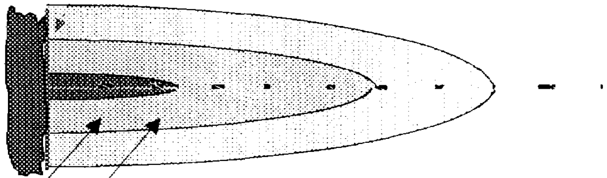
TYPE: Single Planar

Source Thickness in Sat. Zone* 50 (ft)

Width* (ft) 600

Conc. (mg/L)*	C1
PCE	.051
TCE	.22
DCE	.26
VC	.0
ETH	.009

Vertical Plane Source: Determine Source Well Location and Input Solvent Concentrations



View of Plume Looking Down

Observed Centerline Conc. at Monitoring Wells

7. FIELD DATA FOR COMPARISON

PCE Conc. (mg/L)	1.1	.009	.15	.006	.01						
TCE Conc. (mg/L)	1.8	.01	.098	.003	.041						
DCE Conc. (mg/L)	1.7	.016	.017	.5	.006						
VC Conc. (mg/L)	0.1				.006						
ETH Conc. (mg/L)	0.0		.001		.001						
Dist. from Source (ft)	0	600	1050	1350	1750						

8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN CENTERLINE | RUN ARRAY | Help | Restore Formulas | RESET | SEE OUTPUT | Paste Example

East_UGA_Max conc_30 yr.xls

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DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Start Here → ◉ PCE ○ TCE ○ DCE ○ VC ○ ETH

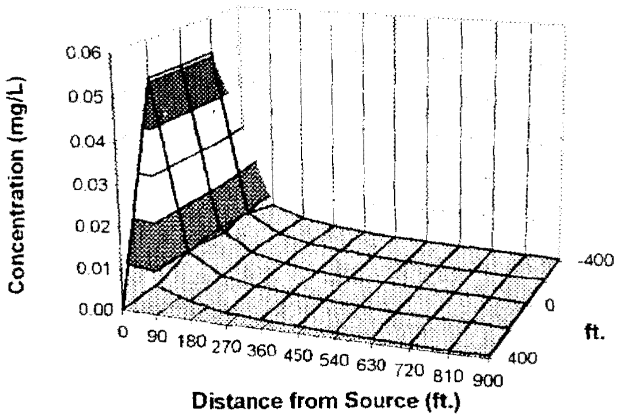
Transverse Distance (ft) / *Distance from Source (ft)*

	0	90	180	270	360	450	540	630	720	810	900
400	0.000	0.007	0.004	0.003	0.002	0.002	0.001	0.001	0.001	0.001	0.001
200	0.051	0.010	0.005	0.003	0.002	0.002	0.001	0.001	0.001	0.001	0.001
0	0.051	0.011	0.005	0.003	0.002	0.002	0.001	0.001	0.001	0.001	0.001
-200	0.051	0.010	0.005	0.003	0.002	0.002	0.001	0.001	0.001	0.001	0.001
-400	0.000	0.007	0.004	0.003	0.002	0.002	0.001	0.001	0.001	0.001	0.001
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: 30 yr   Target Level: 0.005 mg/L   Displayed Model: Biotransformation   Displayed Compound: PCE



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons — Plume Mass If No Degradation	3.3	(Kg)
- Plume Mass If Biotransformation/Production	2.8	(Kg)
Mass Removed	0.5	(Kg)
% Biotransformed =	+14.6%	
% Change in Mass Flux =	#VALUE!	(source to edge)
Current Volume of Ground Water in Plume	14.81	MGal
Flow Rate of Water Through Source Area	0.066	MGD
Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr	0.0	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

If "Can't Calc.", make model area longer

See acre-ft

Compare to Pump and Treat

Plot All Data   Plot Data > Target   Mass HELP   To Centerline   Return to Input

East_UGA_Max conc_30 yr.xls

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Start Here → ○ PCE
◉ TCE
○ DCE
○ VC
○ ETH

DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft)	*Distance from Source (ft)* 0	90	180	270	360	450	540	630	720	810	900
400	0.000	0.031	0.019	0.014	0.010	0.008	0.007	0.005	0.005	0.004	0.003
200	0.220	0.043	0.023	0.015	0.011	0.009	0.007	0.006	0.005	0.004	0.004
0	0.220	0.048	0.025	0.016	0.012	0.009	0.007	0.006	0.005	0.004	0.004
-200	0.220	0.043	0.023	0.015	0.011	0.009	0.007	0.006	0.005	0.004	0.004
-400	0.000	0.031	0.019	0.014	0.010	0.008	0.007	0.005	0.005	0.004	0.003
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

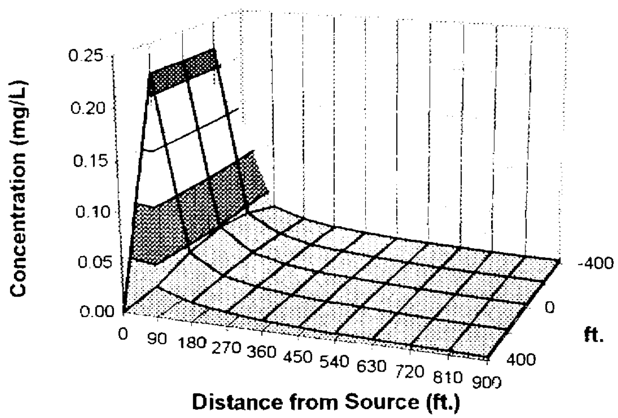
Show Biotransformation

Time: 30 yr

Target Level: 0.005 mg/L

Displayed Model: Biotransformation

Displayed Compound: TCE



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	14.0	*(Kg)*
- Plume Mass If Biotransformation/Production	12.6	*(Kg)*
Mass Removed	1.4	*(Kg)*

If "Can't Calc.", make model area longer

% Biotransformed = **+10.3%**

% Change in Mass Flux = **#VALUE!** (source to edge)

See acre-ft

Current Volume of Ground Water in Plume	51.16	*MGal*
Flow Rate of Water Through Source Area	0.066	*MGD*

Compare to Pump and Treat

Pumping Rate		*(gpm)*
# Pore Volumes Removed Per Yr.	0.0	
# Pore Volumes to Clean-Up		
Clean-Up Time		*(yr)*

Mass HELP | To Centerline | Return to Input

Plot All Data | Plot Data > Target

East_UGA_Max conc_30 yr.xls

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R2-0001231

Start Here → ○ PCE ○ TCE ◉ DCE ○ VC ○ ETH

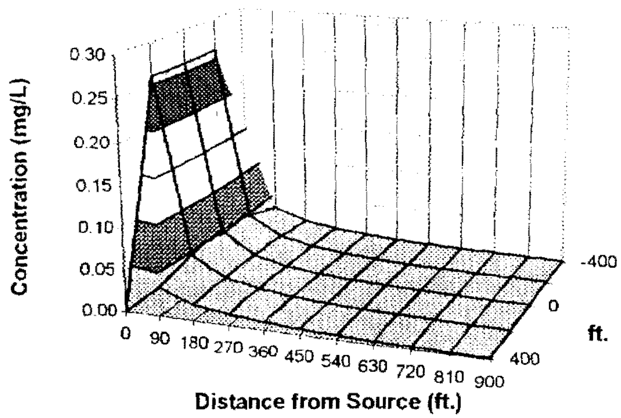
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) \ *Distance from Source (ft)*	0	90	180	270	360	450	540	630	720	810	900
400	0.000	0.034	0.020	0.013	0.009	0.007	0.005	0.004	0.003	0.003	0.002
200	0.260	0.047	0.024	0.015	0.010	0.007	0.005	0.004	0.003	0.003	0.002
0	0.260	0.053	0.025	0.015	0.010	0.007	0.006	0.004	0.003	0.003	0.002
-200	0.260	0.047	0.024	0.015	0.010	0.007	0.005	0.004	0.003	0.003	0.002
-400	0.000	0.034	0.020	0.013	0.009	0.007	0.005	0.004	0.003	0.003	0.002
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: **30** yr   Target Level: **0.070** mg/L   Displayed Model: **Biotransformation**   Displayed Compound: **DCE**



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	16.6	(Kg)
- Plume Mass If Biotransformation/Production	13.0	(Kg)
Mass Removed	3.6	(Kg)

If "Can't Calc.", make model area longer

% Biotransformed = **+21.9%**

% Change in Mass Flux = **#VALUE!** (source to edge)

See acre-ft

Current Volume of Ground Water in Plume	44.43	MGal
Flow Rate of Water Through Source Area	0.066	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	0.0	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data   Plot Data > Target   Mass HELP   **To Centerline**   **Return to Input**

East_UGA_Max conc_30 yr.xls

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R2-0001232

Start Here → ○ PCE
○ TCE
○ DCE
◉ VC
○ ETH

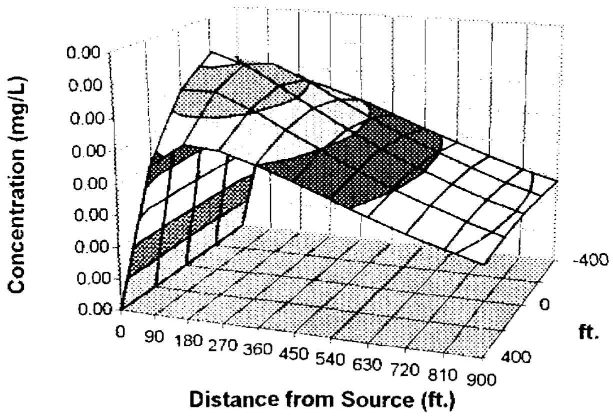
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft)	***Distance from Source (ft)*** 0	90	180	270	360	450	540	630	720	810	900
400	0.000	0.002	0.003	0.003	0.003	0.002	0.002	0.002	0.002	0.002	0.001
200	0.000	0.003	0.003	0.003	0.003	0.002	0.002	0.002	0.002	0.002	0.001
0	0.000	0.004	0.003	0.003	0.003	0.003	0.002	0.002	0.002	0.002	0.001
-200	0.000	0.003	0.003	0.003	0.003	0.002	0.002	0.002	0.002	0.002	0.001
-400	0.000	0.002	0.003	0.003	0.003	0.002	0.002	0.002	0.002	0.002	0.001
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: **30** yr   Target Level: **0.002** mg/L   Displayed Model: **Biotransformation**   Displayed Compound **VC**



Plot All Data   Plot Data > Target

East_UGA_Max conc_30 yr.xls

Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	0.0	*(Kg)*
- Plume Mass If Biotransformation/Production	1.6	*(Kg)*
Mass Removed	-1.6	*(Kg)*
% Biotransformed =		
% Change in Mass Flux =	**#VALUE!**	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	0.00	*MGal*
Flow Rate of Water Through Source Area	0.066	*MGD*

Compare to Pump and Treat

Pumping Rate		*(gpm)*
# Pore Volumes Removed Per Yr.	#DIV/0!	
# Pore Volumes to Clean-Up		
Clean-Up Time		*(yr)*

Mass HELP   To Centerline   Return to Input

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Start Here → ○ PCE
○ TCE
○ DCE
○ VC
◉ ETH

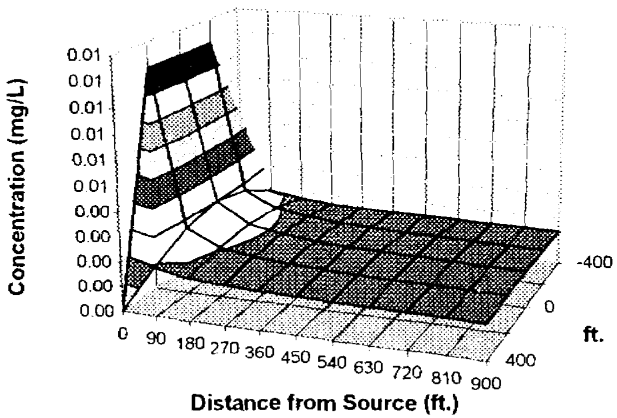
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft)	*Distance from Source (ft)* 0	90	180	270	360	450	540	630	720	810	900
400	0.000	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001
200	0.009	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001
0	0.009	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001
-200	0.009	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001
-400	0.000	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: **30** yr   Target Level: mg/L   Displayed Model: **Biotransformation**   Displayed Compound **ETH**



Plot All Data   Plot Data > Target

Plume Mass (Order-of-Magnitude Accuracy)

See Gallons — Plume Mass If No Degradation	0.6	*(Kg)*
- Plume Mass If Biotransformation/Production	1.3	*(Kg)*
Mass Removed	-0.7	*(Kg)*
If "Can't Calc.", make model area longer — **% Biotransformed =**	**-129.3 %**	
% Change in Mass Flux =	**#VALUE!**	(source to edge)
See acre-ft — Current Volume of Ground Water in Plume	4.04	*MGal*
Flow Rate of Water Through Source Area	0.066	*MGD*
Compare to Pump and Treat — Pumping Rate		*(gpm)*
# Pore Volumes Removed Per Yr.	0.0	
# Pore Volumes to Clean-Up		
Clean-Up Time		*(yr)*

Mass HELP   To Centerline   Return to Input

East_UGA_Max conc_30 yr.xls

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R2-0001234

Start Here → ○ PCE ○ TCE ○ DCE ◉ VC ○ ETH

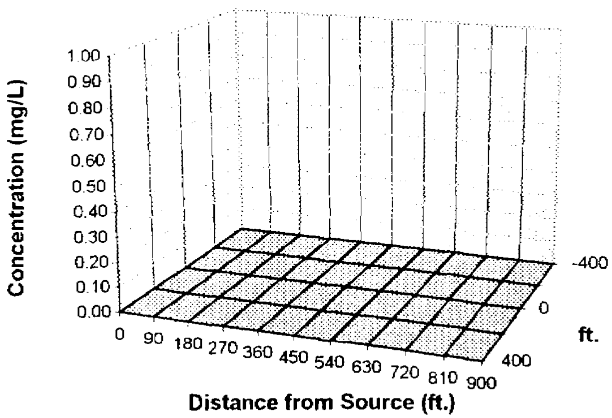
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft)	*Distance from Source (ft)* 0	90	180	270	360	450	540	630	720	810	900
400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: 30 yr   Target Level: **0.002** mg/L   Displayed Model: **No Degradation**   Displayed Compound: **VC**



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	0.0	(Kg)
- Plume Mass If Biotransformation/Production	1.6	(Kg)
Mass Removed	-1.6	(Kg)

If "Can't Calc.", make model area longer

% Biotransformed =

% Change in Mass Flux = #VALUE! (source to edge)

See acre-ft

Current Volume of Ground Water in Plume	0.00	MGal
Flow Rate of Water Through Source Area	0.066	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	#DIV/0!	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data   Plot Data > Target   Mass HELP   To Centerline   Return to Input

East_UGA_Max conc_30 yr.xls

Lawler, Matusky & Skelly Engineers LLP

R2-0001235

Start Here → ○ PCE
○ TCE
○ DCE
○ VC
◉ ETH

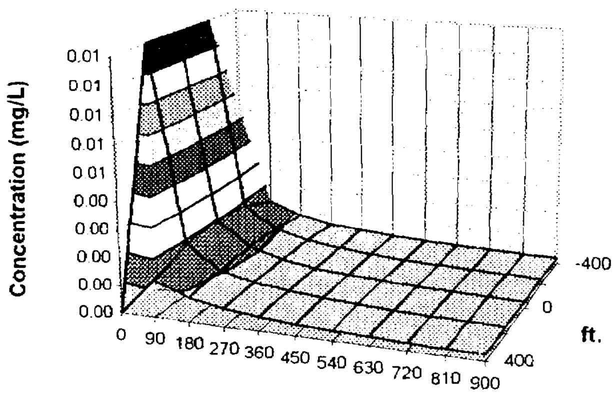
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft)	*Distance from Source (ft)* 0	90	180	270	360	450	540	630	720	810	900
400	0.000	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000
200	0.009	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000
0	0.009	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000
-200	0.009	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000
-400	0.000	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: 30 yr   Target Level: mg/L   Displayed Model: No Degradation   Displayed Compound: ETH



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	0.6	(Kg)
- Plume Mass If Biotransformation/Production	1.3	(Kg)
Mass Removed	-0.7	(Kg)
% Biotransformed =	-129.3 %	
% Change in Mass Flux =	#VALUE!	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	4.04	MGal
Flow Rate of Water Through Source Area	0.066	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr	0.0	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data   Plot Data > Target   Mass HELP   To Centerline   Return to Input

East_UGA_Max conc_30 yr.xls

Lawler, Matusky & Skelly Engineers LLP

R2-0001236

Eastern Plume: Magothy Aquifer

BIOCHLOR Natural Attenuation Decision Support System

Version 1.0

NYSDEC
NCIA SITE
Run Name

Data Input Instructions:

115 — 1. Enter value directly... or
or — 2. Calculate by filling in gray cells. Press Enter, then
0.02 — (To restore formulas, hit "Restore Formulas" button)
Variable* — Data used directly in model.

Test if Biotransformation is Occurring → Natural Attenuation Screening Protocol

TYPE OF CHLORINATED SOLVENT: Ethenes ● Ethanes ○

1. ADVECTION

Seepage Velocity*	Vs	177.2	(ft/yr)
or			
Hydraulic Conductivity	K	1.8E-02	(cm/sec)
Hydraulic Gradient	i	0.00146	(ft/ft)
Effective Porosity	n	0.15	(-)

2. DISPERSION

Alpha x Calc. Method	760	(ft)
(Alpha y) / (Alpha x)	0.705	(-)
(Alpha z) / (Alpha x)	1.E-01	(-)

Change Alpha x Calc. Method

3. ADSORPTION

Retardation Factor* R

or

Soil Bulk Density, rho	2	(kg/L)
FractionOrganicCarbon, foc	1.5E-3	(-)

Partition Coefficient	Koc		R	
PCE	426	(L/kg)	9.5	(-)
TCE	130	(L/kg)	3.6	(-)
DCE	125	(L/kg)	3.5	(-)
VC	30	(L/kg)	1.6	(-)
ETH	302	(L/kg)	7.0	(-)

Common R (used in model)* = 3.6

4. BIOTRANSFORMATION — **-1st Order Decay Coef***

Zone 1		λ (1/yr)	half-life (yrs)	Yield*
PCE	TCE	0.635		0.79
TCE	DCE	0.475		0.74
DCE	VC	1.740		0.64
VC	ETH	1.360		0.45

Zone 2		λ (1/yr)	half-life (yrs)
PCE	TCE	0.000	
TCE	DCE	0.000	
DCE	VC	0.000	
VC	ETH	0.000	
ETH	Ethane	0.000	

5. GENERAL

Simulation Time*	30	(yr)
Modeled Area Width*	700	(ft)
Modeled Area Length*	1000	(ft)
Zone 1 Length*	1000	(ft)
Zone 2 Length*	0	(ft)

L W

Zone 2= L - Zone 1

6. SOURCE DATA

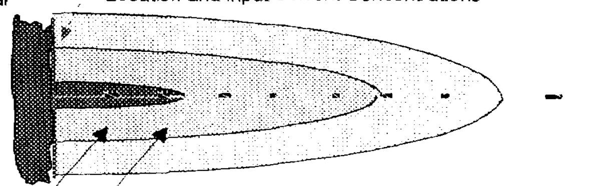
Source Options TYPE: Single Planar

Source Thickness in Sat. Zone* 100 (ft)

Width* (ft) 500

Conc. (mg/L)*	C1
PCE	1.1
TCE	1.8
DCE	1.7
VC	.006
ETH	.001

Vertical Plane Source: Determine Source Well Location and Input Solvent Concentrations



View of Plume Looking Down

Observed Centerline Conc. at Monitoring Wells

7. FIELD DATA FOR COMPARISON

PCE Conc. (mg/L)	1.1	.009	.15	.006	.01						
TCE Conc. (mg/L)	1.8	.01	.098	.003	.041						
DCE Conc. (mg/L)	1.7	.016	.017	.5	.006						
VC Conc. (mg/L)	0.1				.006						
ETH Conc. (mg/L)	0.0		.001		.001						
Dist. from Source (ft)	0	600	1050	1350	1750						

8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN CENTERLINE — RUN ARRAY — *Help* — Restore Formulas — RESET — *SEE OUTPUT* — Paste Example

Start Here → ◉ PCE
○ TCE
○ DCE
○ VC
○ ETH

DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

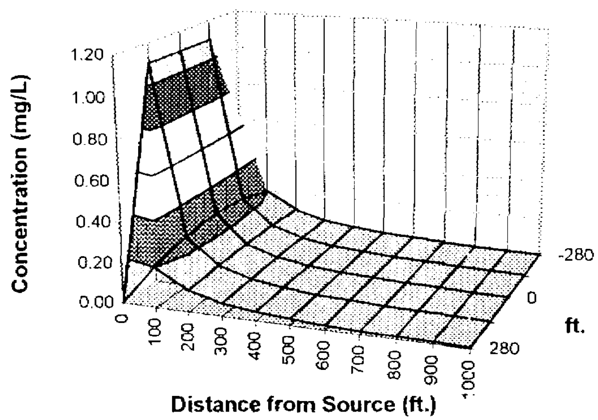
Transverse Distance (ft)	*Distance from Source (ft)* 0	100	200	300	400	500	600	700	800	900	1000
280	0.000	0.200	0.106	0.065	0.043	0.030	0.022	0.016	0.012	0.009	0.007
140	1.100	0.249	0.119	0.071	0.046	0.032	0.023	0.017	0.013	0.010	0.007
0	1.100	0.268	0.124	0.073	0.047	0.032	0.023	0.017	0.013	0.010	0.007
-140	1.100	0.249	0.119	0.071	0.046	0.032	0.023	0.017	0.013	0.010	0.007
-280	0.000	0.200	0.106	0.065	0.043	0.030	0.022	0.016	0.012	0.009	0.007
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: 30 yr Target Level: 0.005 mg/L Displayed Model: Biotransformation

Displayed Compound: PCE



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons	Plume Mass If No Degradation	128.8	(Kg)
	- Plume Mass If Biotransformation/Production	95.4	(Kg)
	Mass Removed	33.4	(Kg)
If "Can't Calc.", make model area longer	**% Biotransformed =**	**+25.9%**	
	% Change in Mass Flux =	**#VALUE!**	(source to edge)
See acre-ft	Current Volume of Ground Water in Plume	Can't Calc.	MGal
	Flow Rate of Water Through Source Area	0.027	MGD
Compare to Pump and Treat	Pumping Rate		(gpm)
	# Pore Volumes Removed Per Yr.		
	# Pore Volumes to Clean-Up		
	Clean-Up Time		(yr)

Plot All Data | Plot Data > Target

Mass HELP | To Centerline | Return to Input

East_MA_Max conc_30 yr.xls

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Start Here → PCE
◉ TCE
○ DCE
○ VC
○ ETH

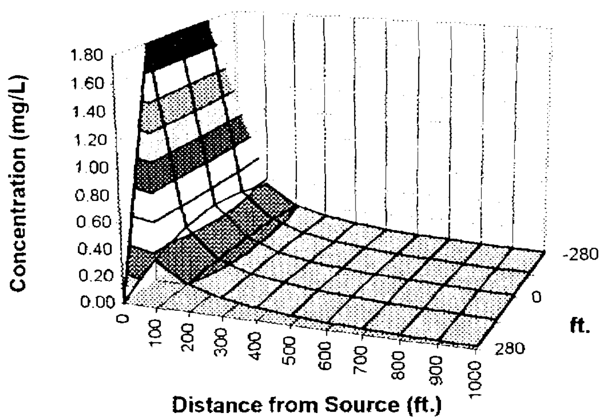
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft)	*Distance from Source (ft)* 0	100	200	300	400	500	600	700	800	900	1000
280	0.000	0.354	0.202	0.133	0.095	0.071	0.055	0.043	0.034	0.028	0.023
140	1.800	0.441	0.228	0.145	0.101	0.075	0.057	0.045	0.035	0.028	0.023
0	1.800	0.475	0.237	0.149	0.103	0.076	0.058	0.045	0.036	0.029	0.023
-140	1.800	0.441	0.228	0.145	0.101	0.075	0.057	0.045	0.035	0.028	0.023
-280	0.000	0.354	0.202	0.133	0.095	0.071	0.055	0.043	0.034	0.028	0.023
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: 30 yr Target Level: 0.005 mg/L Displayed Model: Biotransformation Displayed Compound: TCE



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	210.8	(Kg)
- Plume Mass If Biotransformation/Production	178.9	(Kg)
Mass Removed	32.0	(Kg)
% Biotransformed =	+15.2%	
% Change in Mass Flux =	#VALUE!	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	Can't Calc.	MGal
Flow Rate of Water Through Source Area	0.027	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.		
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data | Plot Data > Target | Mass HELP | To Centerline | Return to Input

East_MA_Max conc_30 yr.xls

Lawler, Matusky & Skelly Engineers LLP

R2-0001240

Start Here → ○ PCE
○ TCE
◉ DCE
○ VC
○ ETH

DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

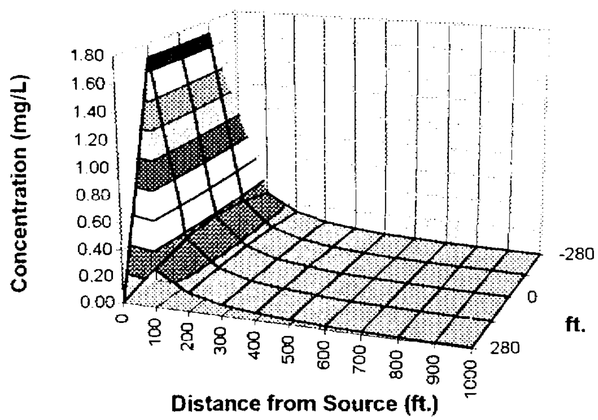
Transverse Distance (ft) / *Distance from Source (ft)*

	0	100	200	300	400	500	600	700	800	900	1000
280	0.000	0.285	0.141	0.081	0.051	0.034	0.024	0.017	0.013	0.010	0.008
140	1.700	0.355	0.159	0.088	0.055	0.036	0.025	0.018	0.013	0.010	0.008
0	1.700	0.383	0.165	0.091	0.056	0.037	0.026	0.018	0.013	0.010	0.008
-140	1.700	0.355	0.159	0.088	0.055	0.036	0.025	0.018	0.013	0.010	0.008
-280	0.000	0.285	0.141	0.081	0.051	0.034	0.024	0.017	0.013	0 010	0.008
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: **30** yr Target Level: **0.070** mg/L Displayed Model: **Biotransformation** Displayed Compound **DCE**



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons Plume Mass If No Degradation	199.1	(Kg)
- Plume Mass If Biotransformation/Production	133.1	(Kg)
Mass Removed	66.0	(Kg)
% Biotransformed =	**+33.2%**	
% Change in Mass Flux =	**#VALUE!**	(source to edge)

If "Can't Calc." make model area longer

See acre-ft

Current Volume of Ground Water in Plume	Can't Calc.	MGal
Flow Rate of Water Through Source Area	0.027	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.		
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data | Plot Data > Target | Mass HELP | To Centerline | Return to Input

East_MA_Max conc_30 yr.xls

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R2-0001241

Start Here → ○ PCE
○ TCE
○ DCE
◉ VC
○ ETH

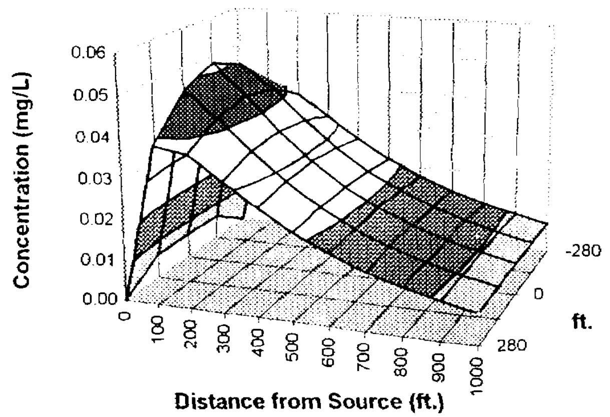
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) \ *Distance from Source (ft)*	0	100	200	300	400	500	600	700	800	900	1000
280	0.000	0.039	0.037	0.032	0.026	0.021	0.017	0.014	0.012	0.009	0.008
140	0.006	0.048	0.042	0.035	0.028	0.023	0.018	0.015	0.012	0.010	0.008
0	0.006	0.052	0.044	0.036	0.029	0.023	0.019	0.015	0.012	0.010	0.008
-140	0.006	0.048	0.042	0.035	0.028	0.023	0.018	0.015	0.012	0.010	0.008
-280	0.000	0.039	0.037	0.032	0.026	0.021	0.017	0.014	0.012	0.009	0.008
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: 30 yr   Target Level: 0.002 mg/L   Displayed Model: Biotransformation   Displayed Compound: VC



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	0.7	*(Kg)*
- Plume Mass If Biotransformation/Production	24.9	*(Kg)*
Mass Removed	-24.2	*(Kg)*

If "Can't Calc.", make model area longer

% Biotransformed = -3443.5 %

% Change in Mass Flux = #VALUE! (source to edge)

See acre-ft

Current Volume of Ground Water in Plume	Can't Calc.	*MGal*
Flow Rate of Water Through Source Area	0.027	*MGD*

Compare to Pump and Treat

Pumping Rate		*(gpm)*
# Pore Volumes Removed Per Yr.		
# Pore Volumes to Clean-Up		
Clean-Up Time		*(yr)*

Plot All Data   Plot Data > Target

Mass HELP   To Centerline   Return to Input

East_MA_Max conc_30 yr.xls

Lawler, Matusky & Skelly Engineers LLP

R2-0001242

Start Here → ○ PCE ○ TCE ○ DCE ○ VC ◉ ETH

DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) / *Distance from Source (ft)*	0	100	200	300	400	500	600	700	800	900	1000
280	0.000	0.015	0.019	0.020	0.021	0.020	0.020	0.019	0.018	0.017	0.016
140	0.001	0.019	0.021	0.022	0.022	0.021	0.021	0.020	0.019	0.018	0.017
0	0.001	0.020	0.022	0.023	0.022	0.022	0.021	0.020	0.019	0.018	0.017
-140	0.001	0.019	0.021	0.022	0.022	0.021	0.021	0.020	0.019	0.018	0.017
-280	0.000	0.015	0.019	0.020	0.021	0.020	0.020	0.019	0.018	0.017	0.016
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

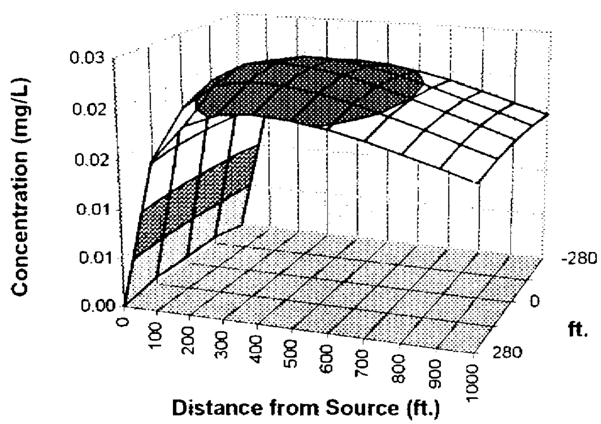
Show Biotransformation

Time: 30 yr

Target Level: [ ] mg/L

Displayed Model: Biotransformation

Displayed Compound: ETH



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	0.1	(Kg)
- Plume Mass If Biotransformation/Production	20.9	(Kg)
Mass Removed	-20.8	(Kg)
% Biotransformed =	-25339.8 %	
% Change in Mass Flux =	**#VALUE!**	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	Can't Calc.	MGal
Flow Rate of Water Through Source Area	0.027	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.		
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data | Plot Data > Target | Mass HELP | To Centerline | Return to Input

East_MA_Max conc_30 yr.xls

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Start Here → ○ PCE
○ TCE
○ DCE
◉ VC
○ ETH

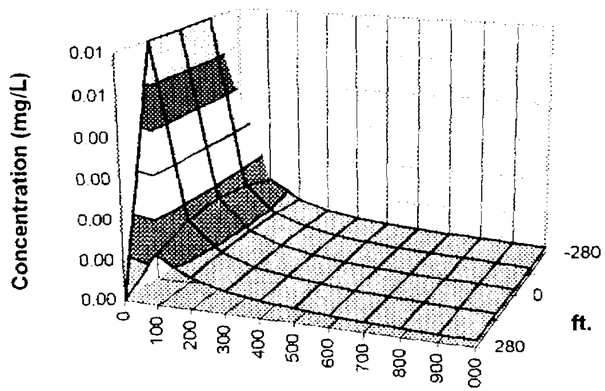
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft)	*Distance from Source (ft)* 0	100	200	300	400	500	600	700	800	900	1000
280	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
140	0.006	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.006	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-140	0.006	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-280	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

Show Biotransformation

Time: 30 yr   Target Level: 0.002 mg/L   Displayed Model: No Degradation   Displayed Compound: VC



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	0.7	(Kg)
- Plume Mass If Biotransformation/Production	24.9	(Kg)
Mass Removed	-24.2	(Kg)
% Biotransformed =	-3443.5 %	
% Change in Mass Flux =	**#VALUE!**	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	4.71	MGal
Flow Rate of Water Through Source Area	0.027	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	0.0	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data   Plot Data > Target   Mass HELP   To Centerline   Return to Input

East_MA_Max conc_30 yr.xls

Lawler, Matusky & Skelly Engineers LLP

R2-0001244

Start Here → ○ PCE
○ TCE
○ DCE
○ VC
◉ ETH

DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) / *Distance from Source (ft)*	0	100	200	300	400	500	600	700	800	900	1000
280	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
140	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-140	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-280	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MASS FLUX (mg/day)	-	-	-	-	-	-	-	-	-	-	-

Show No Degradation

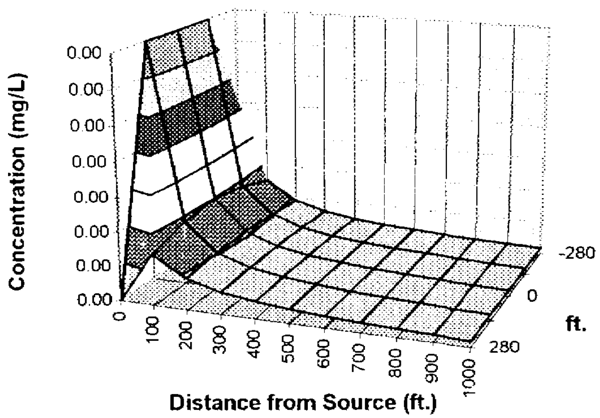
Show Biotransformation

Time: 30 yr

Target Level: mg/L

Displayed Model: No Degradation

Displayed Compound: ETH



Plume Mass (Order-of-Magnitude Accuracy)

See Gallons

Plume Mass If No Degradation	0.1	*(Kg)*
- Plume Mass If Biotransformation/Production	20.9	*(Kg)*
Mass Removed	-20.8	*(Kg)*

If "Can't Calc.", make model area longer

% Biotransformed = -25339.8 %

% Change in Mass Flux = #VALUE! (source to edge)

See acre-ft

Current Volume of Ground Water in Plume	0.00	*MGal*
Flow Rate of Water Through Source Area	0.027	*MGD*

Compare to Pump and Treat

Pumping Rate		*(gpm)*
# Pore Volumes Removed Per Yr.	#DIV/0!	
# Pore Volumes to Clean-Up		
Clean-Up Time		*(yr)*

Mass HELP | To Centerline | Return to Input

Plot All Data | Plot Data > Target

East_MA_Max conc_30 yr.xls

Lawler, Matusky & Skelly Engineers LLP

R2-0001245

APPENDIX K

IN-WELL VAPOR STRIPPING SENSITIVITY ANALYSIS

SENSITIVITY ANALYSIS OF UVB AND DDC IN-WELL VAPOR STRIPPING TECHNOLOGIES

New Cassel Industrial Area Off-site Groundwater FS

	UVB [1]	DDC [2]
Number of wells [3]	13	19
Cost per well [4]	$75,000	$60,000
Total system well cost	$975,000	$1,140,000
Radius of Influence	see notes [5]	175 ft

1 UVB = Unterdruck-Verdampfer-Brunnen.
2 DDC = Density Driven Convection.
3 Analysis based on in-well vapor stripping Alternative 5A (remediation of upper and deep portions of aquifer to NYS Class GA standards) for NCIA off-site groundwater.
4 Costs per well based on quotes received from venders of UVB and DDC treatment systems.
5 For UVB, radii of influence for 3 types of treatment wells were established:
  - -shallow UVB well = 175 ft.
  - -deep UVB well = 325 ft
  - -containment wall UVB well = 500 ft

APPENDIX L

EVALUATION OF LOCAL AND CENTRAL VAPOR TREATMENT FACILITIES FOR IN-WELL VAPOR STRIPPING AND PUMP & TREAT GROUNDWATER REMEDIATION TECHNOLOGIES

Evaluation of Local and Central Vapor Treatment Facilities for In-Well Vapor Stripping and Groundwater Extraction/Air Stripping (Pump and Treat) Groundwater Remediation Technologies

Introduction.
Conceptual design and cost evaluations have been conducted by Lawler, Matusky & Skelly Engineers LLP (LMS) for two groundwater remediation technologies, in-well vapor stripping and groundwater extraction/air stripping ("pump and treat"). In-well vapor stripping, an emerging treatment technology, acts by removing contaminants (e.g., volatile organic compounds [VOCs]) from the groundwater within a series of stripper wells (i.e., in-situ treatment), transfering the contaminants to the vapor phase above the water level in each treatment well, and then extracting the contaminated vapor from the subsurface for subsequent treatment. Groundwater extraction and air stripping is a remedial technology that has been performed at numerous inactive hazardous waste sites. It utilizes extraction wells to remove contaminated groundwater from the subsurface. Contaminants such as VOCs can typically be removed from the extracted groundwater at the ground surface via a range of treatment processes (i.e., liquid phase treatment [precipitation, carbon adsorption, etc.] or vapor phase treatment [carbon adsorption, oxidation, etc.]). The following evaluation compares treatment and system control facilities for the two groundwater remediation technologies, in terms of conceptual lay-out and costs. For purposes of this assessment, it is assumed that vapor phase treatment of VOC-contaminated groundwater is conducted.

In-Well Vapor Stripping.
Analyses of conceptual designs and costs have previously been evaluated for the in-well vapor stripping groundwater treatment technology. Literature reviews and feasibility study evaluations have been conducted. Although a few different configurations exist, this evaluation focuses on the Unterdruck-Verdampfer-Brunnen (UVB) in-well vapor stripping system. However, this analysis can generally be applied to the overall in-well vapor stripping technology.

Evaluations have shown that the utilization of multiple system control/vapor phase treatment vaults (that can be placed in the subsurface near each stripper well at a contaminated site) is both more economical and practical for an overall groundwater treatment approach when compared to utilizing a single, large central control/treatment building to treat all contaminated vapor generated from all of the stripper wells at a given site. For instance, a comparison of two in-well vapor stripping systems, one that utilized nine stripper wells and nine local control/treatment vaults and another that had a central control/treatment building, was conducted for a particular site. The remedial objectives, clean-up to NYS Class GA groundwater standards, were assumed for both scenarios. It was found that the system employing the local treatment vaults were 15 – 20% less expensive than the scenario that used central treatment. In addition, as the in-well vapor stripping technology is an in-situ process that extracts only contaminated vapor from the subsurface for subsequent treatment (i.e., groundwater is not extracted for the subsurface), small, local control and vapor treatment systems (i.e., granular activated carbon vessels) can be housed in small, subsurface vaults adjacent to each well head. This scenario can result in huge economic savings over centralized vapor treatment, as the construction of a large central treatment facility (i.e., construction, land acquisition, maintenance) that is capable of processing contaminated vapor from all of the stripper wells at a site can be very expensive. As an example, for the site scenarios with nine stripper wells (noted above), it was found that one local treatment vault would occupy approximately 150 sf in land area (hence allowing "low-profile", subsurface vault construction), while the central treatment building was estimated to be well over 1500 sf and require above ground construction and a relatively large amount of land acquisition. Also, the cost of installing subsurface trenches for air injection, vapor extraction, and system control lines from a central treatment building to each of the stripper wells at the site (e.g., approximately 8000 l.f. for the nine well scenario described above) is typically much more expensive than the installation of small subsurface control/treatment vaults (minor trenching) near each well head. Logistically, the installation of a large, central vapor treatment/system control center and extensive trenching may meet with local regulatory and public opposition. Conversely, the local vaults are "low-profile" and can be designed to blend with the surroundings. In addition, a given site may not have land that is accessible or available to construct an above ground treatment building, and topography and access issues may limit or prevent trenching in certain areas. The small control/treatment vaults can often be placed in existing streets or rights-of-way. Thus, multiple local system control and treatment vaults are an economical and practical option for in-well vapor stripping remediation systems.

Pump & Treat.
As noted, analyses of conceptual designs and costs have also been evaluated for the groundwater extraction/air stripping treatment (pump and treat) technology through literature reviews and feasibility studies.

Previous feasibility studies have shown that utilizing a central, above ground vapor phase treatment facility at a site is typically more economical and practical when compared to utilizing multiple, local treatment buildings to treat all contaminated vapor generated from all of the extraction wells. [Note that pump and treat is an ex-situ technology that requires several system and treatment controls and large areas for the processing of both contaminated groundwater and vapor. Additionally, subsequent to treatment the extracted groundwater is re-injected to the subsurface through a series of wet wells that also require land area. Thus, unlike in-well vapor stripping, installation and use of small, local treatment vaults is not viable.] A comparison of two pump and treat systems, one that utilized eleven groundwater extraction wells and a single, central treatment building and the other employing eleven extraction wells with three local treatment buildings (i.e., same site and remedial goals), showed that the configurations employing central treatment were about 20% less expensive than systems employing local treatment.

As mentioned above, a single central treatment building that houses the pump and treat system controls, along with the numerous stages of water and vapor treatment components, can be quite large and require significant land acquisition. The building must also be capable of handling and processing significant quantities of groundwater from all of the extraction wells at a site. In addition, groundwater re-injection wells (wet wells) that are commonly placed in the immediate vicinity of the treatment building also require additional land area. For the pump and treat scenario that considers multiple, local control/treatment buildings, each of the facilities would need to be large enough to handle groundwater and contaminated vapor generated from some of the extraction wells at the site. Even if only a few extraction wells are serviced by a given local treatment building, the building still needs to be large enough to house the process equipment necessary to treat the groundwater and vapor. Thus, the number of multiple, localized pump and treat control/treatment buildings that could be constructed is governed by the costs of such buildings (i.e., the greater the number of local treatment facilities considered, the lower the costs associated with trenching but the higher the costs associated with land acquisition and building construction). The evaluation for the two pump and treat alternatives discussed above (central vs. local treatment) showed that the system with the central control/treatment facility required one 4000 sf building and six 8 ft diameter wet wells. The same pump and treat scenario with the central treatment option required over 9000 l.f of subsurface trenching. The total capital cost for the central building, groundwater treatment equipment, wet wells, and trenching was approximately $1.7 million. The local treatment scenario had three local treatment buildings of 3200, 2400, and 2000 sf (total building area of 7600 sf), a total of eight 8 ft diameter wet wells, and about 9000 l.f. of trenching. The total capital cost for the three buildings, groundwater treatment equipment, wet wells, and trenching was about $2.5 million. However, these estimated capital costs do not consider the costs associated with land acquisition, permitting, and other administrative issues, all of which would be anticipated to be much greater for the local control/treatment scenario (three buildings) than for the central control/treatment option (one building). Thus a single, central system control and treatment system is an economical and practical option for pump and treat remediation systems.

Conclusions.

As shown, based on previous studies of two groundwater treatment technologies, local vapor phase treatment generally appears to be the most practical and economic option for in-well vapor stripping, and centralized vapor phase treatment generally seems to be the optimal alternative for pump and treat systems. However, as factors such as remedial objectives, hydrogeology and geology, topography, regulatory and public involvement, and land use and access can differ at each site, the ultimate design of in-well vapor stripping and pump and treat groundwater remediation systems should consider all site-specific factors.